Mexican Wolf Recovery Program:
Progress Report #18

Reporting Period: January 1 – December 31, 2015

Prepared by: U.S. Fish and Wildlife Service

Cooperators: Arizona Game and Fish Department, USDA-APHIS Wildlife Services, US Forest Service, and White Mountain Apache Tribe

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Foreword

The U.S. Fish and Wildlife Service (Service) is the lead agency responsible for recovery of the Mexican wolf *(Canis lupus baileyi),* pursuant to the Endangered Species Act of 1973, as amended (Act, or ESA). The Mexican Wolf Recovery Program has two interrelated components: 1) Recovery – includes aspects of the program administered by the Service that pertain to the overall goal of Mexican wolf recovery and delisting from the list of threatened and endangered species, and 2) Reintroduction – includes aspects of the program implemented by the Service and cooperating States, Tribes, other Federal agencies, and counties that pertain to management of the reintroduced Mexican wolf population in the Mexican Wolf Experimental Population Area (MWEPA). This report provides details on both aspects of the Mexican Wolf Recovery Program. The reporting period for this progress report is January 1 – December 31, 2015.

Background

The Mexican wolf is listed as endangered under the Act in the southwestern United States and Mexico (80 FR 2488-2512, January 16, 2015). It is the smallest, rarest, southernmost occurring, and most genetically distinct subspecies of the North American gray wolf.

Mexican wolves were extirpated from the wild in the southwestern United States by 1970, primarily as a result of a decades-long concerted effort to eradicate them due to livestock conflicts. Recovery efforts for the Mexican wolf began when it was listed as an endangered species in 1976. In the late 1970s and early 1980s, the initiation of a binational captive breeding program originating from just seven wolves saved the Mexican wolf from extinction.

The recovery effort for the Mexican wolf focuses on maintenance of the captive breeding population and the reestablishment of wolves in the wild, as recommended by the 1982 Mexican Wolf Recovery Plan. Mexican wolves were first released to the wild in March 1998.

Today, the reintroduced population is managed and monitored by an Interagency Field Team (IFT) comprised of staff from the Service, Arizona of Game and Fish Department (AGFD), White Mountain Apache Tribe (WMAT), US Forest Service, and U.S. Department of Agriculture-Wildlife Services (USDA-WS). The New Mexico Department of Game and Fish withdrew as a partner agency in 2011. In Mexico, federal agencies initiated a reintroduction effort in 2011 pursuant to Mexico's federal laws and regulations.

PART A: RECOVERY ADMINISTRATION

1. Mexican Wolf Captive Breeding Program

a. Mexican Wolf Species Survival Plan (SSP)

The SSP is a binational captive breeding program between the United States and Mexico for the Mexican wolf. Its mission is to reestablish the Mexican wolf in the wild through captive breeding, public education, and research. SSP members routinely transfer Mexican wolves among participating facilities for breeding to promote genetic exchange and maintain the health and genetic diversity of the captive population. Wolves in these facilities are rigorously managed in accordance with a Service-approved standard protocol.

This year, the SSP held its annual binational meeting to plan and coordinate wolf breeding, transfers, and related activities among facilities at the Chapultepec Zoo in Mexico City, Mexico. The meeting entailed updates on the reintroduced populations in the US and Mexico, discussion on the gamete banking plan for 2016, evaluation and selection of release candidates for both the US and Mexico, and reports on research including advances in gamete banking, potential effects of a variety of contraception methods, and progress toward lifetime reproductive planning for female wolves.

As of July 2015, the SSP captive population includes approximately 243 captive Mexican wolves managed in 54 facilities in the United States and Mexico. This current population size is only slightly above the SSP goal of housing a minimum of 240 wolves with a target population size of 300 to ensure the security of the species in captivity and produce surplus animals for reintroduction.

The SSP captive population was the sole source population to reestablish the species in the wild, as it was extirpated throughout its range in the United States and Mexico. The SSP captive population is now the source to improve the genetic diversity by providing wolves for release into the wild population. Thus, without the SSP, recovery of the Mexican wolf would not be possible. Wolves that are considered genetically well represented in the SSP population may be designated for release. Within that pool of wolves, suitable release candidates are determined based on criteria such as genetic makeup, reproductive performance, behavior, and physical suitability. Additional analyses are performed to ensure that the reintroduced population is receiving wolves of appropriate and balanced genetic history. This minimizes any adverse effects to the genetic integrity of the captive population, in the event that wolves released to the wild do not survive. Based on these standards, this year the SSP identified two Mexican wolf pairs to breed at the Service's Sevilleta Wolf Management Facility for potential release in the US in 2016.

Mexican wolf F1362 at the Sevilleta Wolf Management Facility. Credit: US Fish and Wildlife Service.

b. Mexican Wolf Pre-Release Facilities

Mexican wolves are acclimated prior to release to the wild in captive facilities designed to house wolves in a manner that fosters wild characteristics and behaviors. The Service oversees the management at two of these facilities; the Ladder Ranch and Sevilleta Wolf Management Facilities, located in New Mexico within the MWEPA. At these facilities, wolves are managed with minimal exposure to humans for the purpose of minimizing habituation to humans and maximizing pair bonding, breeding, pup rearing, and healthy pack structure development. These facilities have been successful in breeding wolves for release and are integral to Mexican wolf recovery efforts. To further minimize habituation to humans, public visitation to the Ladder Ranch and Sevilleta facilities is not permitted.

Release candidates are sustained on carnivore logs and a zoo-based exotic canine diet formulated for wild canids. Diets of release candidates are supplemented with carcasses of road-killed ungulate species, such as deer and elk, and scraps from local game processors (meat, organs, hides, and bones) from wild game/prey species only. Release candidates are given annual examinations to vaccinate for canine diseases (e.g., parvo, adeno2, parinfluenza, distemper and rabies viruses, etc.), are dewormed, have laboratory evaluations performed, and have their overall health condition evaluated. Animals are treated for other veterinary purposes on an as-needed basis.

Sevilleta Wolf Management Facility

The Sevilleta Wolf Management Facility (Sevilleta) is located on the Sevilleta National Wildlife Refuge near Socorro, New Mexico and is managed entirely by the Service. There are a total of eight enclosures, ranging in size from 0.25 acre to approximately 1.25 acres, and a quarantine pen. In 2015 the refuge staff continued to assist Mexican Wolf Recovery Program staff in the maintenance and administration of the wolf pens. Through the course of the year, 11 individual wolves were housed at Sevilleta. At the start of the year, four wolves were housed at Sevilleta. During the year, four wolves were received from participating SSP institutions in the United States, plus three wolves were received from the MWEPA. Four wolves were transferred out of Sevilleta; two wolves to SSP facilities in the United States, and two wolves to the MWEPA. One death and no births occurred at Sevilleta in 2015. At year's end, the facility housed six wolves.

Ladder Ranch Wolf Management Facility

The Ladder Ranch Wolf Management Facility (Ladder Ranch), owned by R. E. Turner, is located on the Ladder Ranch near Truth or Consequences, New Mexico. There are a total of five enclosures, ranging in size of 0.25 acre to 1.0 acre. The caretaking of wolves at the facility is carried out by an employee of the Turner Endangered Species Fund, though the facility is managed and supported financially by the Service. During 2015, two individual wolves were housed at the Ladder Ranch. Both wolves were transferred out to SSP facilities in the United States. No births or deaths occurred at the Ladder Ranch in 2015. At year's end, the Ladder Ranch was not housing any Mexican wolves.

2. Recovery Planning

This year, the Service continued its effort to revise the 1982 Mexican Wolf Recovery Plan. The Service invited participants from New Mexico Department of Game and Fish, Arizona Game and Fish Department, Utah Division of Wildlife Resources, Colorado Parks and Wildlife, federal agencies in Mexico, and independent scientists from the US and Mexico to assist us in gathering and assessing scientific information pertinent to our development of a revised recovery plan. We expect to produce a draft recovery plan for public and peer review in early 2017, and a final recovery plan by the end of November 2017. The Service previously initiated the revision of the recovery plan, but did not produce an agency-approved draft or final plan.

Additional updates on the revision of the recovery plan will be available during 2016-2017 on our website, *https://www.fws.gov/southwest/es/mexicanwolf/MWRP.cfm*.

3. Mexican Gray Wolf Subspecies Listing

On January 16, 2015, we finalized a rule to list the Mexican wolf as an endangered subspecies (80 FR 2488-2512, January 16, 2015). The Mexican wolf has been protected as endangered by the Act since 1976; our 2015 listing rule served to separate the Mexican wolf from the gray wolf proposed delisting determination (78 FR 35664, June 13, 2013). Our determination on the Mexican wolf resulted in a revision to the List of Endangered and Threatened Wildlife by making a separate entry for the Mexican wolf. We found that the Mexican wolf is endangered

due to illegal shooting, inbreeding, loss of heterozygosity, loss of adaptive potential, small population size, and the cumulative effect of these factors.

4. Revision to the Nonessential Experimental Population of the Mexican Wolf and Environmental Impact Statement

On January 16, 2015, the Service published the Revision to Regulations for the Nonessential Experimental Population of the Mexican Wolf (80 FR 2512-2567, January 16, 2015). This 2015 10(j) Rule provides a fourfold expansion of the area where Mexican wolves are expected to occur and a tenfold increase in the area where Mexican wolves can initially be released from captivity compared to the previous 1998 10(j) rule. The 2015 10(j) Rule also allows management activities in Arizona to be methodically phased west of Highway 87 over a period of up to 12 years (with triggers that would enable westward expansion), extends the MWEPA's southern boundary to the US-Mexico border in Arizona and New Mexico, clarifies definitions (including provision for take of Mexican wolves), and provides a population objective of 300-325 Mexican wolves in the MWEPA.

In coordination with development of this rule, the Service completed the Final Environmental Impact Statement for the Proposed Revision to Regulations for the Nonessential Experimental Population of the Mexican Wolf, pursuant to the National Environment Policy Act, in November 2014 (79 FR 70154-70155). We issued a Record of Decision on January 6, 2015, selecting Alternative One (Proposed Action and Preferred Alternative) for implementation.

5. Summary of 2015 Litigation

Plaintiffs: Defenders of Wildlife; Center for Biological Diversity; Endangered Wolf Center; David R. Parsons; Wolf Conservation Center
Defendants: Secretary of the Interior, US Fish and Wildlife Service
Intervenors: Protect American Now; Colorado Farm Bureau; NM Farm and Livestock Bureau; Utah Farm Bureau; Coalition of AZ and NM Counties for Stable and Economic Growth
Allegation: Violation of ESA for failure to prepare a recovery plan
Date NOI Filed: September 10, 2014
Date Complaint Filed: November 11, 2014
Case Number/Court: 4:14-cv-0472 JGZ (D. Ariz.)
Status: Settlement discussions ongoing

Plaintiffs: Center for Biological Diversity; Defenders of Wildlife
Defendants: Secretary of the Interior; US Fish and Wildlife Service
Intervenors: State of Arizona (Defendant)
Allegation: (APA) Violations of NEPA in revising the 10(j) Rule and issuance of associated 10(a)(1)(A) permit
Date NOI Filed: No NOI Filed on alleged APA violations; January 16, 2015 NOI pertaining to 10(a)(1)(A) permit
Date Complaint Filed: January 16, 2015; amended complaint filed March 23, 2015
Case Number/Court: 4:15-cv-00019-LAB (D. Ariz.)
Status: Ongoing

Plaintiffs: AZ and NM Coalition of Counties for Stable Economic Growth et al (18 plaintiffs)
Defendants: US Fish and Wildlife Service; Secretary of the Interior; Dan Ashe; Benjamin Tuggle
Intervenors: None
Allegation: Violations of APA, NEPA, Regulatory Flex Act. E.O. 12898 in implementing the Record of Decision/FEIS and 2015 10(j) Rule
Date NOI Filed: No NOI filed
Date Complaint Filed: February 12, 2015
Case Number/Court: 4:15-cv-00179-FRZ (D. Ariz.)
Status: Consolidated with District of Arizona case 4:15-cv-00019-JGZ

Plaintiffs: Wild Earth Guardians; New Mexico Wilderness Alliance; Friends of Animals
Defendants: Director of the US Fish and Wildlife Service; Secretary of the Interior
Intervenors: None
Allegation: Violation of ESA for not considering essential status for Mexican wolves; Violation of NEPA for not assessing revisions to final rule
Date NOI Filed: March 24, 2015
Date Complaint Filed: July 2, 2015
Case Number/Court: 4:15-cv-00285-JGZ (D. Ariz.)
Status: Consolidated with District of Arizona case 4:15-cv-00019-JGZ

Plaintiffs: State of Arizona
Defendants: Secretary of the Interior, US Fish and Wildlife Service
Intervenors: State of Colorado; NM Department of Game and Fish; State of Utah (Plaintiffs)
Allegation: Violation of ESA for failure to revise recover plan
Date NOI Filed: January 20, 2015
Date Complaint Filed: June 8, 2015
Case Number/Court: 4:15-cv-00245-JGZ (D. Ariz.)
Status: Settlement discussions ongoing

Plaintiffs: Safari Club International
Defendants: Secretary of the Interior; US Fish and Wildlife Service
Intervenors: Center for Biological Diversity, Defenders of Wildlife (Defendants)
Allegation: Violations of ESA, APA, and NEPA promulgating the 2015 10(j) Rule and FEIS/ROD
Date NOI Filed: August 3, 2015
Date Complaint Filed: October 16, 2015
Case Number/Court: 4:16-cv-00094-JGZ (D. Ariz.)
Status: Ongoing

Mexican wolf M1130 at the Sevilleta Wolf Management Facility during capture and processing in preparation for release. Credit: Pascal Berlioux.

6. Reintroduction Project Structure

At the end of 2015, the signatories to the Memorandum of Understanding (MOU) that guides the reintroduction and management of the Mexican wolf population in the MWEPA included AGFD, USDA-Forest Service, USDA-WS, WMAT, and the Service, as well as the cooperating counties of Gila, Graham, Greenlee, and Navajo in Arizona and the Eastern Arizona Counties Organization (ECO). A copy of this MOU can be found at *https://www.fws.gov/southwest/es/mexicanwolf/documents.cfm* The MOU is currently being revised to address the provisions of the revised 2015 10(j) Rule.

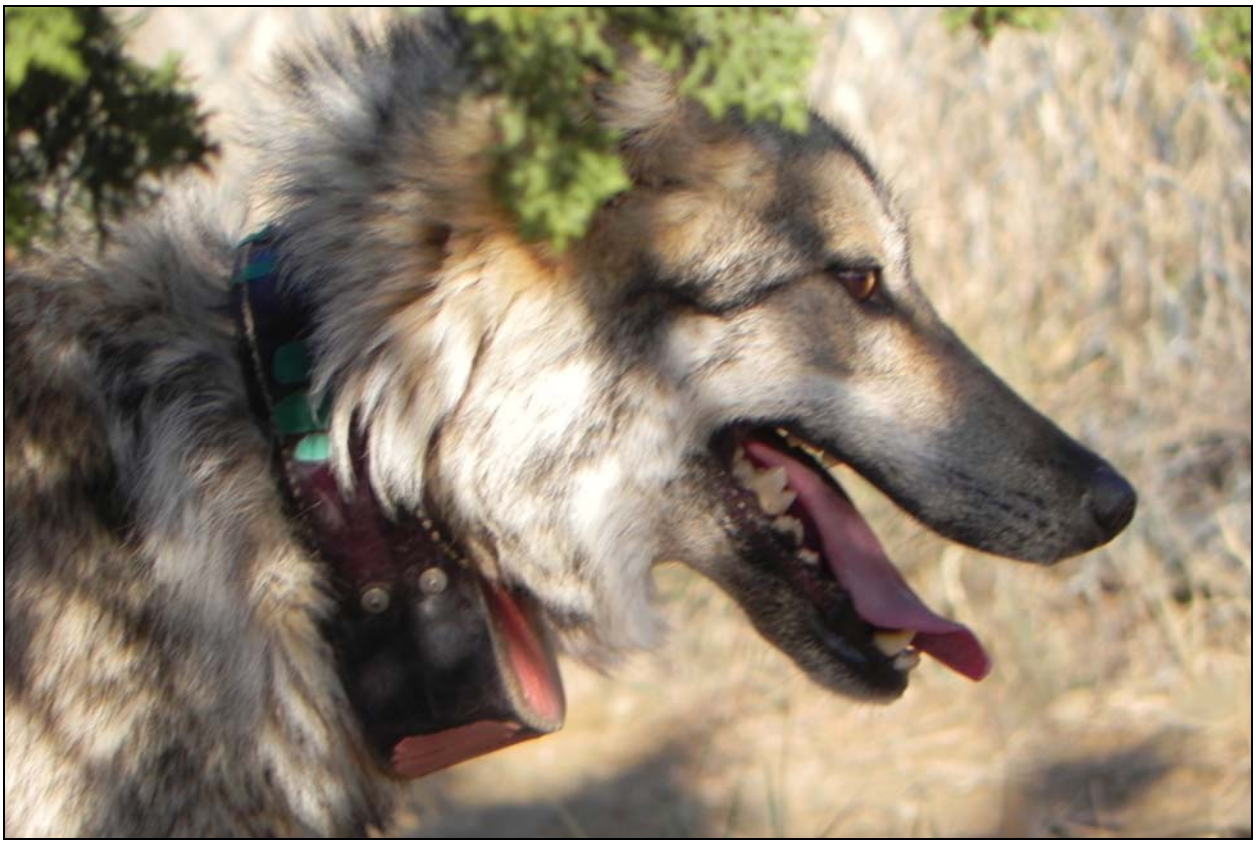
Each year the IFT produces an Annual Report, detailing Mexican wolf field activities (e.g., population status, reproduction, mortalities, releases/translocations, dispersal, depredations, etc.) in the MWEPA. The 2015 report is included as PART B of this document. Monthly MWEPA project updates are available at *https://www.fws.gov/southwest/es/mexicanwolf* or you may sign up to receive them electronically by visiting *http://www.azgfd.gov/eservices/subscribe.shtml*. Additional information about the Reintroduction Project can be found on the Service's web page at: *https://www.fws.gov/southwest/es/mexicanwolf* or AGFD's web page at: *https://www.azgfd.com/wildlife/speciesofgreatestconservneed/mexicanwolves/*

7. Cooperative Agreements

In 2015, the Service funded cooperative agreements with AGFD, National Fish and Wildlife Foundation (NFWF) San Carlos Apache Tribe (SCAT), TESF, The Living Desert, University of Idaho, University of New Mexico, and WMAT. The Service also provides funding to AGFD through section 6 of the Act, which requires 25% percent matching funds from Arizona.

Cooperator	USFWS/Mexican Wolf Project Funds Provided in 2014
AGFD	$ 165,000
NFWF	$ 40,000
SCAT	$ 40,000
TESF	$ 29,000
The Living Desert	$ 30,000
University of New Mexico	$ 10,000
University of Idaho	$ 10,000
White Mountain Apache Tribe	$ 205,000

In addition to the above agreements, the Service also provided funding for several miscellaneous contracts for veterinary, helicopter, mule packing and other services. For more information on Program costs to date visit *https://www.fws.gov/southwest/es/mexicanwolf/documents.cfm*



Mexican wolf F1305 at the Sevilleta Wolf Management Facility. Credit: US Fish and Wildlife Service.

8. Mexican Wolf/Livestock Interdiction Fund and Mexican Wolf/Livestock Council

The Service, in cooperation with the National Fish and Wildlife Foundation, established the Mexican Wolf /Livestock Interdiction Trust Fund (Interdiction Fund) on September 23, 2009. The objective of the Interdiction Fund is to generate long-term funding for prolonged financial support to livestock operators within the framework of conservation and recovery of Mexican wolf populations in the Southwest. Funding will be applied to initiatives that address management, monitoring, and other proactive conservation needs for Mexican wolves as they relate to livestock, including alternative livestock husbandry practices, grazing management alternatives, livestock protection, measures to avoid and minimize depredation, habitat protection, species protection, scientific research, conflict resolution, compensation for damage, education, and outreach activities.

In 2015, the 11 member Coexistence Council that administers the Mexican Wolf/Livestock Interdiction Trust Fund (Fund) changed its name to the Mexican Wolf/Livestock Council. The following table reflects disbursements of funds associated with the Fund from its initiation through the end of 2015. The Council continued implementation of its strategic plan, approved in 2014, focusing on reducing livestock/wolf conflicts and the need for management removals of depredating or nuisance wolves. More information can be found at *http://www.coexistencecouncil.org/*

Year	Direct Compensation for Livestock Lost	Payments for Wolf Presence	Total
2011	$18,181	N/A	$18,181
2012	$22,600	N/A	$22,600
2013	$27,594	$85,500	$113,094
2014	$63,724	$85,500	$149,224
2015	$104,144	Applications due June 1, 2016	TBD

9. Literature Cited

US Fish and Wildlife Service. 1982, Mexican Wolf Recovery Plan 1982, US Fish and Wildlife Service, Albuquerque, New Mexico.

US Fish and Wildlife Service. 1998, Final Rule. Establishment of a Nonessential Experimental Population of the Mexican Gray Wolf in Arizona and New Mexico, 63 *Federal Register* 1752-1772.

US Fish and Wildlife Service, 2013, Proposed Rule. Removing the Gray Wolf (Canis lupus) From the List of Endangered and Threatened Wildlife and Maintaining Protections for the Mexican Wolf (Canis lupus baileyi) by Listing It as Endangered, *78 Federal Register* 35664-35719.

US Fish and Wildlife Service, 2014. Final Environmental Impact Statement for the Proposed Revision to the Regulations for the Nonessential Experimental Population of the Mexican Wolf. *79 Federal Register* 70154-70155.

US Fish and Wildlife Service, 2015. Revision to the Regulations for the Nonessential Experimental Population of the Mexican Wolf. *80 Federal Register* 2512-2567.

US Fish and Wildlife Service, 2015. Endangered Status for the Mexican Wolf. *80 Federal Register* 2488-2512.

PART B: REINTRODUCTION

Mexican Wolf Experimental Population Area
Interagency Field Team Annual Report
Reporting Period: January 1 – December 31, 2015

Prepared by:
Arizona Game and Fish Department, U.S. Department of Agriculture - Animal and Plant Health Inspection Service - Wildlife Services, U.S. Forest Service, U.S. Fish and Wildlife Service, and White Mountain Apache Tribe.

Lead Agencies:
Arizona Game and Fish Department (AGFD)
USDA-APHIS Wildlife Services (USDA-WS) U.S. Fish and Wildlife Service (USFWS)
U.S. Forest Service (USFS)
White Mountain Apache Tribe (WMAT)

The 2015 annual report reflects the 2014 population parameters published in the 2014 annual report addendum (http://www.fws.gov/southwest/es/mexicanwolf/documents.cfm).

1. Introduction

This report summarizes results of Mexican Wolf Interagency Field Team (IFT) activities during 2015. The Mexican Wolf Reintroduction Project (Reintroduction Project) is part of a larger recovery program that is intended to reestablish the Mexican wolf (*Canis lupus baileyi*) within its historical range.

The Reintroduction Project is conducted in accordance with a nonessential experimental population Final Rule (USFWS 2015; 2015 10(j) Rule) that expanded the Mexican Wolf Experimental Area (MWEPA) south of Interstate 10 to the United States-Mexico border, discontinued the designation of the Blue Range Wolf Recovery Area and White Sands Wolf Recovery Area, and established three management areas (Zone 1, 2, and 3: Fig. 1) south of Interstate 40 in Arizona and New Mexico. These new designations resulted in a fourfold increase in suitable habitat that Mexican wolves can occupy (Zones 1-3) and a tenfold increase in areas that Mexican wolves can be released and/or translocated (Zone 1-2). Zone 1 includes all of the Apache, Gila, and Sitgreaves national Forests; the Payson, Pleasant Valley and Tonto Basin Ranger Districts of the Tonto National Forest; and the Magdalena Ranger District of the Cibola National Forest. In 2000, the White Mountain Apache Tribe (WMAT) agreed to allow free-ranging Mexican wolves to inhabit the Fort Apache Indian Reservation (FAIR). The FAIR is in east-central Arizona, and provides 2440 mi^2 (6319 km^2) of area that wolves may occupy.

In March 1998, the first release of Mexican wolves occurred on the Alpine and Clifton Ranger Districts of the Apache-Sitgreaves National Forest, Arizona. The wild population peaked at 110 wolves in 2014, but declined to a minimum count of 97 wolves in 2015 principally due to reduced pup survival in 2015 relative to 2014. One translocation and one initial release occurred in 2015. At the end of 2015, the wild population totaled a minimum of 97 wolves, and 21 packs;

12 of which produced at least one pup that survived to year-end. More information on population statistics can be found at
http://www.fws.gov/southwest/es/mexicanwolf/ and
http://www.azgfd.gov/w_c/es/wolf_reintroduction.shtml

Wolf age and sex abbreviations used in this document:
A = alpha/breeder (wolf that has successfully bred and produced/sired at least one pup)
M = adult male (> two years old)
F = adult female (> two years old)
m = subadult male (one - two years old)
f = subadult female (one - two years old)
mp = male pup (< one year old)
fp = female pup (< one year old)

2. Methods

The IFT followed Standard Operating Procedures (SOPs) approved by the Lead Agencies. The following definitions apply to this report:

Breeding pair: a pack that consists of an adult male and female and at least one pup of the year surviving through December 31.

Wolf pack: two or more wolves that maintain an established territory. In the event that one of the wolves dies, the remaining wolf, regardless of pack size, retains the pack name.

Initial Releases: the release of Mexican wolves to the wild within Zone 1 (Figure 1), or in accordance with tribal or private land agreements in Zone 2 (Figure 1), that have never been in the wild, or releasing pups that have never been in the wild and are less than 5 months old within Zones 1 or 2. The initial release of pups less than 5 months old into Zone 2 allows for the cross-fostering of pups from the captive population into the wild, as well as enables translocation-eligible adults to be re-released in Zone 2 with pups born in captivity (see 2015 10(j) rule at www.fws.gov/southwest/es/mexicanwolf/pdf/Mx_wolf_10j_final_rule_to_OFR.pdf).

Translocations: the release of Mexican wolves into the wild that have previously been in the wild. In the MWEPA translocations will occur only in Zones 1 and 2 (Figure 1; see 2015 10(j) Rule at www.fws.gov/southwest/es/mexicanwolf/pdf/Mx_wolf_10j_final_rule_to_OFR.pdf).

Depredation: confirmed killing or wounding of lawfully-present domestic animals by one or more Mexican wolves.

Depredation incident: means the aggregate number of livestock killed or mortally wounded by an individual wolf or by a single pack of wolves at a single location within a one-day (24 hr.) period, beginning with the first confirmed kill, as documented in an initial IFT incident investigation pursuant to SOP 11.0.

Releases and Translocations

Initial release candidates are considered genetically surplus to the captive breeding program. Translocation candidates are wolves with prior wild experience, which are re-released into the wild from captivity or another location in the wild. Mexican wolves are acclimated prior to release to the wild in captive facilities designed to house wolves in a manner that fosters wild characteristics and behaviors. The Service oversees the management at two of these facilities; the Ladder Ranch and Sevilleta Wolf Management Facilities, located in New Mexico within the MWEPA.

In pre-release facilities, contact between wolves and humans is minimized. Carcasses of road-killed native prey species, primarily deer (*Odocoileus* spp.) and elk (*Cervus canadensis*), supplement the routine diet of processed canine food supplied to wolves. Genetically and socially compatible breeding pairs are established and evaluated for physical, reproductive, and behavioral suitability for direct release into the wild. Single wolves are also evaluated for release and potential pairing with wolves in the wild.

Prior to release, wolves may be adversely conditioned to avoid certain food types (i.e., domestic livestock) and human presence. As close to release as possible, wolves may be subjected to taste aversion conditioning in efforts to deter their use of domestic livestock as a food source. Separately, or in addition to taste aversion conditioning, wolves in pre-release facilities may be hazed (purposefully harassed) prior to release in efforts to increase their avoidance of humans and/or inhabited areas.

Wolves are released or translocated using either a soft release or a hard release method. The soft release method holds wolves at the release site for one day to several months to acclimate them to the specific area. Soft release pens are constructed of chain link and are approximately 0.30 acre in size. A modified soft release consists of placing the wolves in an acclimation pen approximately 0.13 acre in size and built of nylon mesh, with electric fencing interwoven into the structure. Flagging is also attached to the pen walls approximately every two feet, as a visual barrier to discourage wolves from running into pen walls. Wolves generally self- release within a few days. A hard release is a direct release of a wolf (or wolves) from a crate into the wild or into an enclosure built of fladry (flagging hanging on a rope surrounding a small protected area; sometimes the fladry "fence-line" is electrified).

Radio Telemetry Monitoring

In 2015, all wolves equipped with radio-collars were monitored by standard radio telemetry from the ground and once weekly from the air as opportunity allowed. In addition, many wolves were equipped with GPS collars to provide more detailed location information. Visual observations, wolf behavior, evidence of a kill site, associated uncollared wolves, and fresh sign were also noted when possible. Location data were entered into the project's Access database for analysis.

Aerial and satellite locations of wolves were used to develop home ranges (White and Garrott 1990). Until 2014, wolf home range polygons were generated using the minimum convex polygon (MCP) method (White and Garrott 1990). However, kernel methods can provide more accurate home range estimates than minimum convex polygon (MCP) models (Seaman and Powell 1996) and have shown to be robust to variation in the number of locations used to create

the home range (Seaman et al. 1999). Thus, kernel density estimates were used to generate home range polygons for 2015.

Home ranges were calculated using ≥20 individual locations on a pack, pair, or single wolf exhibiting territorial behavior over a period of ≥ six months. For 2015, the number of individual locations used ranged from 25 to 366 locations, depending on the number of individual locations obtained throughout the year. To maximize sample independence, individual radio-collared wolf locations were included in home range calculations only if individual wolf locations were spatially or temporally separated from other pack members equipped with radio-collars. Individual point selection was accomplished with R (R Core Team 2015). This limited pseudo-replication of locations. Home range polygons were generated using the 95% fixed kernel method (Seaman and Powell 1996) in the Geospatial Modeling Environment platform in conjunction with ArcGIS 10 (Beyer 2014, ESRI 2011). Home ranges were not calculated for wolves that had < 20 locations, displayed dispersal behavior, or exhibited non- territorial behavior during 2015.

Mexican wolf M1241. Credit: Mexican Wolf IFT

Occupied Range
Occupied wolf range was calculated based on the following criteria: (1) a five mile (eight km) radius around all aerial or GPS locations of radio monitored wolves over the past three years; (2) a five mile (eight km) radius around all uncollared wolf locations and wolf sign over the past three years; (3) a MCP is then placed over all buffered locations; if buffered locations are greater than ten miles apart, a separate MCP is generated for those points, and (4) per the 2015 Final Rule, occupied range does not include tribal lands.

Predation and Depredation Investigations
Throughout the year, project personnel investigated ungulate carcasses as they were discovered to determine sex, age, general body condition, and whether the carcass had been scavenged or killed by wolves. In addition, the IFT continued to study Mexican wolf kill rates and prey selection within the MWEPA on non-tribal lands. GPS cluster analysis was conducted using data from downloadable GPS collars to detect predation events during a 30-day time period in winter (February/March) and summer (June/July). A GPS cluster was defined as a group of two or more GPS points in which each point is <100m from its nearest neighbor (Sand et al. 2005, Ruth et al. 2010, Metz et al. 2012); GPS fix rates were set to one point every two hours in winter and every hour in summer. To reduce the potential of missing wolf killed prey, 25% of all single GPS points were randomly selected in ArcGIS for investigation (Sand et al. 2005). Identified GPS clusters were investigated within one week of determination, following abandonment by wolves; all points within a cluster were investigated regardless if a carcass was located at a previous GPS point (Ruth et al. 2010). The information gathered will be used to gain a more robust measure of the biomass required per wolf to sustain a viable wolf population, determine the prey characteristics (e.g. species, sex, age, and nutritional condition) selected by Mexican wolves, and assess kill site characteristics. All domestic livestock carcasses located via cluster analyses were reported to USDA-WS wolf specialists to initiate a depredation investigation.

USDA-WS wolf specialists investigated suspected wolf depredations on livestock, including livestock located during the predation study, within 24 hours of receiving a report. Not all dead livestock were found, or found in time to document cause of death. Accordingly, depredation numbers in this report represent the minimum number of livestock killed by wolves.

Since the beginning of Mexican wolf reintroduction in 1998, the 17 year mean number of cattle confirmed killed by wolves per year is 14.2, which extrapolates to 26.3 cattle killed per year/100 Mexican wolves.

Wolf Management
The IFT hazed wolves on foot or by vehicle in cases where wolves localized near areas of human activity, or were found feeding on, chasing, or killing livestock. When necessary, the IFT used rubber bullets, cracker shells, and fladry to encourage aversive response to humans and to discourage nuisance and depredation behavior. The IFT captured wolves with foot-hold traps to collar, translocate, or remove wolves from the wild for specific management purposes. In addition, wolves that establish themselves outside the MWEPA are captured and brought back into the MWEPA or temporarily held in captivity, per the Final Rule (USFWS 2015).

Proactive Management Activities
The IFT utilized various proactive management activities in an attempt to reduce wolf-livestock conflicts in the MWEPA. Proactive management approaches and tools available to the IFT include:

Turbo Fladry: electric fence with colored flagging installed around livestock holding pastures and private property designed to discourage wolf presence inside the perimeter of the fencing.

Hay and Supplements: feed and mineral supplements purchased for livestock producers who opt to hold livestock on private property during livestock calving season or wolf denning periods.

Range Riders: contract employees with radio telemetry equipment who assist livestock producers in monitoring wolf movements in relation to livestock, providing human presence, and conducting light hazing to deter wolves away from cattle. Range Riders without telemetry equipment provided additional human presence to deter wolves.

Altering Livestock Grazing Rotations: moving livestock between different pastures within USFS grazing allotments in order to avoid areas of high wolf use that may correspond to den and rendezvous sites.

Exclusionary Fencing: eight-foot-high fence enclosing areas of private property for the purposes of protecting especially vulnerable animals or to address other specific property protection purposes.

Radio Telemetry Equipment: monitoring equipment used by the IFT, and in some cases issued to livestock producers to facilitate their own proactive management activities and aid in the detection and prevention of wolf depredations.

Diversionary Food Cache: road-killed native prey carcasses or carnivore logs provided to wolves in areas to reduce potential conflicts with livestock.

Supplemental Food Cache: road-killed native prey carcasses or carnivore logs provided to wolves in order to assist a pack or remnant of a pack in feeding young of the year when extenuating circumstances reduce their own ability to do so (e.g. one animal raising young or just after initial releases and translocations).

Population Estimation
The year-end population estimate is derived from information gathered through a variety of methods that are deployed annually by the IFT from November 1st through the year-end helicopter count. The IFT continued to employ comprehensive efforts initiated in 2006 to make the 2015 year-end population estimate more accurate. Management actions implemented included increased surveys and focus on trapping for uncollared wolves, greater coordination and investigation of wolf sightings provided through the public and other agency sources, deployment of remote trail cameras (blind and scented), and utilizing howl surveys and food caches in conjunction with remote cameras in areas of suspected uncollared wolf use.

Wolf sign (i.e. tracks, scats) was documented by driving roads and hiking canyons, trails, or other areas closed to motor vehicles. Confirmation of uncollared wolves was achieved via visual observation, remote cameras, howling, scats, and tracks. Ground survey efforts for suspected packs having no collared members were documented using global positioning system (GPS) and geographical information systems (GIS) software and hardware. GPS locations were recorded and downloaded into GIS software for analysis and mapping. Survey data were also recorded daily on forms and compiled in an Access database.

In January and February 2016, aircraft were used to document free-ranging wolves for the end-of-year 2015 population count and to capture wolves to affix radio collars. Including January and February data in the December 31 end-of-year count (and in this 2015 annual report) is appropriate, because wolves alive in these months were also alive in the preceding December (i.e. whelping only occurs in Spring, and any wolf added to the population via initial release or translocation after December 31 and before the end of the survey is not counted in the year-end minimum population count). Fixed-wing aircraft were used to locate wolves and assess the potential for darting wolves from the helicopter. A helicopter was used to more accurately count the number of uncollared wolves associated with collared wolves in all areas and to capture target animals (e.g. uncollared wolves, injured wolves, or wolves with old collars) where the terrain allowed.

As part of the 2015 population year-end count, the IFT coordinated with and surveyed members of the local public to identify possible wolf sightings. Ranchers, private landowners, wildlife managers, USFS personnel, and other agency cooperators were contacted to increase wolf sighting data for the database. All such sightings were analyzed by the IFT to determine those that most likely represented unknown wolves or packs for purposes of completing the year-end count.

Documentation of wolves or wolf sign, obtained through the above methods, was also used to guide IFT efforts to trap uncollared single wolves or groups. The IFT objective was to have at least one member of each pack collared. Through these various methods, the IFT was able to count uncollared wolves not associated with collared wolves.

Mortality

Wolf mortalities were identified via telemetry and public reports. Mortality signals from radio collars were investigated within 12 hours of detection to determine the status of the wolf. Carcasses were investigated by law enforcement agents and necropsies were conducted to determine proximate cause of death. Causes were summarized for all known wolf deaths.

For wolves equipped with radio-collars, mortality, missing, and removal rates were calculated using methods presented in Heisey and Fuller (1985). Wolves not located or documented alive for three or more months are considered missing or "fate unknown." These wolves may have died, dispersed, or have a malfunctioned radio collar. The IFT calculated annual cause-specific mortality rates (i.e. human-caused versus natural/unknown mortality) for the population. Management removals can have an effect equivalent to mortalities on the free-ranging population of Mexican wolves (see Paquet et al. 2001). Thus, the IFT also calculated yearly cause-specific removal rates for wolves equipped with radio-collars. Wolves are removed from

the population for three primary causes: (1) cattle depredations, (2) nuisance to humans, and (3) other (principally to pair with other wolves or to move a wolf to a more appropriate area without any of the other causes occurring first). Each time a wolf was moved, it was considered a removal, regardless of the animal's status later in the year (e.g. if the wolf was translocated or held in captivity). The IFT calculated an overall failure rate of wolves in the wild by combining mortality, missing (only those wolves that went missing under questionable scenarios), and removal rates to represent the overall yearly rate of wolves affected (i.e. dead, missing, or managed) in a given year.

Mexican wolf pup associated with the Iron Creek Pack. Credit: US Fish and Wildlife Service.

Public Outreach

The IFT outreach efforts affirm the project's commitment to engage in effective communication, identify various outreach mechanisms, and standardize certain outreach activities. These goals help ensure timely, accurate, and effective two-way communication between and among cooperating agencies and the public. Project personnel conducted outreach activities on a regular basis, as a means of disseminating information to stakeholders, concerned citizens, and government and non-government organizations. Outreach was facilitated through monthly updates, field contacts, handouts, informational display booths, web page updates, and phone contacts. The IFT provided formal presentations at local livestock producer meetings and conducted one public meeting in 2015 to gather comment on proposed Mexican wolf initial release and translocation actions within the MWEPA.

During 2015, the IFT posted Mexican wolf reintroduction project updates within the MWEPA once each month at places such as USFS offices, US post offices, and libraries, as well as on the AGFD Mexican wolf web site at http://www.azgfd.gov/w_c/es/wolf_reintroduction.shtml and the USFWS Mexican wolf web site at http://www.fws.gov/southwest/es/mexicanwolf. Interested parties could sign up to receive the update electronically by visiting the AGFD web site at http://azgfd.gov/signup. The IFT faxed monthly project updates to primary cooperating agencies, stakeholders and interested citizens.

The IFT also produced a wolf location map bi-weekly to inform cooperators and the public of areas occupied by wolves. The map was posted on the USFWS web site at http://www.fws.gov/southwest/es/mexicanwolf/RWL.cfms.

Project personnel made contact with campers, hunters, and other members of the public within the MWEPA and provided them with information about the wolf project. These contacts focused on advising the public of the potential for encountering wolves, providing general recommendations for recreating in wolf-occupied areas and explaining legal provisions of the non-essential experimental population rule. The IFT also utilized these contacts to collect information on wolf sightings, tracks and scat from the public.

3. Results

Specific information regarding wolves on the FAIR and the San Carlos Apache Reservation (SCAR) is not included in this report in accordance with Tribal agreements.

a. Population Status

At the end of 2015, the minimum population estimate was 97 wolves. Pups comprised 24% of this population, which is a 31% decrease from the previous year.

At the beginning of 2015, the collared population consisted of 55 wolves among 19 packs and four single/unaffiliated wolves. At year end, forty-eight collared wolves (29 adults, 12 subadults, and 7 pups) among 21 packs and four single wolves were documented which was a slight increase in the number of collared wolves from 2014.

A total of 49 uncollared wolves were documented in the MWEPA at the end of 2015 (*note: uncollared wolves captured during the January and February 2016 helicopter operation were included as uncollared animals associated with known packs above*). Thirty-six of the 49 uncollared wolves were associated with 15 packs in which individuals were equipped with radio-collars (Table 1).

The IFT documented two uncollared groups of wolves in New Mexico and three uncollared single wolves (one in Arizona, two in New Mexico) which were not associated with collared packs. Additional uncollared animals were found on the FAIR in 2015. These areas will be priorities for IFT trapping efforts in 2016.

Nine natural pairings of breeding age wolves in the MWEPA population occurred in 2015. The natural pairings of dispersing or single wolves resulted in the designation of four new packs: Panther Creek, Buckalou, Bearwallow, and Marble. Breeding animals were also naturally replaced in three other packs: Hoodoo, Mangas, and Fox Mountain. Finally, two pairs formed naturally but were not designated as packs in 2015. M1161/f1332 paired in January, but f1332 was discovered dead before they were designated a pack. Also, M1284/f1392 paired in late 2015 and at year-end had not been designated a pack.

A total of 8 single wolves equipped with radio-collars (M1161, M1282, M1284, M1331, f1332, m1350, M1337, M1338) were part of the population for a portion of the year. Three of these wolves (M1161, M1331, and M1338) were alive at the end of the year. All of the wolves that were alive at the end of the year (n = 97) were born in the wild.

b. Reproduction

In 2015, 14 packs exhibited denning behavior which included eight packs in Arizona (Bluestem, Tse ighan lige (Diamond), Elk Horn, Hawks Nest, Marble, Hoodoo, Panther Creek, and Tsay-O-Ah) and six packs in New Mexico (Iron Creek, Lava, San Mateo, Luna, Dark Canyon, Prieto). All of these packs but Elk Horn and Luna were confirmed to have produced wild-born litters. The IFT documented a minimum of 42 pups born with a minimum of 23 (14 pups in Arizona and 9 pups in New Mexico) surviving in the wild until year-end which showed that at least 55% of the pups documented in early counts survived until the end of the year (Table 1). This marked the 14th consecutive year in which wild born wolves bred and raised pups in the wild. Of the 21 known packs at the end of 2015, all but the Coronado pack formed naturally in the wild.

Mexican wolf pups associated with the Prieto Pack. Credit: US Fish and Wildlife Service.

c. Releases and Translocations

The IFT conducted one soft release of a pair of wolves (wild born AF1305 with naïve M1130) (Table 2). Early in the year the Rim pack consisted of two siblings traveling together (AF1305 and m1336). The IFT captured and placed them into captivity to prevent their breeding with one another. In an effort to pair-bond AF1305 with another male it was placed in captivity with M1130 from the captive population. On April 24, AF1305, thought to be pregnant at the time, was translocated with M1130 (an initial release) into a soft release pen within the Rim pack territory. It was later determined that AF1305 was not pregnant. The pair split up soon after release. M1130 traveled throughout the MWEPA, and began exhibiting nuisance behavior, and was lethally removed from the population on May 20. AF1305 remained in its territory. On December 14, AF1305 was located dead; cause of death is pending necropsy.

d. Home Ranges and Movements

During 2015 the IFT calculated home ranges for 18 packs or individuals exhibiting territorial behavior. These home ranges ranged from 83 square miles (215 square kilometers) for the Hawks Nest pack to 1673 square miles (4333 square kilometers) for the Fox Mountain pack, with an average home range size of 376 square miles (976 square kilometers). The Fox Mountain pack's home range appears large relative to the other packs; this is due to the pack shifting its home range from historic Fox Mountain territory into historic Willow Spring's territory after the Willow Springs pack broke up. Home ranges were not calculated for single animals or packs that did not display territorial behavior or did not have enough usable locations to generate a home range; this included the Bear Wallow, Coronado, and Mangas packs, which are represented with a red dot on the home range map (Figure 3, Table 3).

Mexican wolves occupied 13,329 mi^2 (34,522 km^2) of the MWEPA during 2015 (Fig. 4). In comparison, Mexican wolves occupied 7,255 mi^2 (18,791 km^2) of the MWEPA during 2014.

e. Mortality

The IFT has documented 124 wolf mortalities in the wild since 1998 (Table 4), thirteen of which occurred in 2015 (Table 5). Five of the documented wolf mortalities in 2015 were considered illegal, including: AF1212, f1332, mp1385, f1388, and f1390. Two wolves died of natural causes: AF903 died following interspecific competition (killed by other wolves) and AM1185 died of pericardial hemorrhage resulting in heart failure; necropsy results also noted older injuries consistent with a possible vehicle strike. Wolf fp1438 died within two weeks post capture and is therefore considered capture related mortality; although a specific cause of death could not be determined via necropsy. Five other mortalities are awaiting necropsy (AF1279, fp1389, AF1305, m1450, and m1351). Other more frequent causes of death should be considered a minimum estimate of mortality, since some pups and uncollared wolves may die without those mortalities being documented by the IFT. Eight wolves from New Mexico (AF1246, AM1252, f1348, m1349, m1350, M1391, M1337, and M1282) and two wolves from Arizona (M1243 and f1395) were listed as "fate unknown" during 2015. The fate unknown wolves tallied above do not include animals whose collars have failed but were known to be in the population at the end of the year. The analyses below include those animals as missing for the purposes of radio day

calculations and missing classification.

The IFT monitored 74 individual wolves equipped with radio-collars for a total of 17,305 radio days during 2015. A total of twenty-seven wolves equipped with radio-collars were considered removed (n = 4), dead (n = 10), or missing (n = 13). Uncollared animals that were documented dead (m1351 [previously collared, but dropped collar in 2014], m1450) were not included in this analysis (see Table 5 for information on these animals). In addition, the capture related mortality of fp1438 was censored from the analysis. Only two (AF1246 and m1350) of the thirteen wolves that went missing in 2015 were considered to have gone missing under questionable scenarios without documentation as being alive later in the year. Thus, these two animals were included as failures at the time of last location during 2015. The overall survival rate was 0.713, or a corresponding failure rate of 0.287. The overall failure rate was composed of the human caused mortality rate (0.090; n = 5), natural mortality rate (0.036; n = 2), unknown/awaiting necropsy mortality rate (0.054; n = 3), boundary removal rate (0.00; n = 0), missing wolves rate (0.036; n = 2), cattle depredation removal rate (0.018; n = 1), nuisance removal rate (0.018; n = 1), and other removal rate (0.036; n = 2)

f. Wolf Predation

Four packs containing at least one GPS collar were selected for the predation study in 2015, two in New Mexico (Luna and Single M1161) and two in Arizona (Bluestem and Hawks Nest). All four packs were studied during the winter period, however, due to collar failures in late winter, only Bluestem and Hawks Nest were studied in Arizona during the summer period. Pack sizes during study periods varied from a minimum of one single adult to nine animals (adults, sub-adults and pups).

During the winter and summer of 2015 (a total of 128 days; total study days for all packs across all study periods), we investigated 129 single GPS point locations and 225 GPS cluster locations from three wolf packs and one individual wolf. We located 59 total prey carcasses including 52 elk, six mule deer, and one Coues white-tailed deer. Of the carcasses investigated, 12 were considered confirmed wolf kills, 33 were considered probable wolf kills, 7 were considered possible wolf kills, and seven were considered unknown. Of the 129 single point locations investigated, we found remains of elk neonates at three of these points. Elk comprised 88% of all carcasses investigated; the other 12% were comprised of deer. Of the elk kills investigated 50% were elk calves while 11.5% were adult cow elk, 22.5% were adult male elk, 4% were adult unknown sex, 4% were yearling unknown sex and 8% were elk of unknown age and sex. Kill rates and consumption rates were used to estimate the total number of prey killed/wolf/day and total kg biomass/wolf/day, respectively. Initial results for investigations in 2015 indicate that a single Mexican wolf may impact ungulate populations equivalent to killing 13.59 cow elk, scavenging on 2.43 cow elk, killing 3.24 mule deer does, and 1.01 white-tailed doe deer annually, which equates to 6.53 kg/wolf/day. These data are slightly higher than the average, but within the range of similar studies conducted on northern gray wolves.

g. Wolf Depredation

During 2015, USDA-WS and other members of the IFT conducted of 90 investigations involving 102 animals reported as having potential Mexican wolf involvement. Of these 90 investigations, 83 involved cattle (n = 95 animals), one involved a horse (n = 1), and six involved dogs (n = 6). Average IFT response time between the reporting of an incident to the initiation of an on-site investigation was < 24 hours.

Of the 90 investigations completed in 2015, 62 (68%) were determined to be wolf-related (confirmed or probable determination; Table 7). Forty-nine cattle deaths were confirmed as wolf depredations in 48 investigations; five cattle deaths were probable wolf depredations in five investigations; eight injured cattle were confirmed as being wolf related in four investigations; and five injured dogs were confirmed as wolf related in 2015 in five investigations. Seventy-six percent (n = 47) of the 62 investigations determined to be wolf related occurred in New Mexico and 24% (n = 15) occurred in Arizona (Table 7). Thirty-one percent (n = 28) of the 90 total investigations were determined to be unknown or non-wolf related. These mortality causes included: unknown, black bear, coyote, dog, respiratory illness, natural causes, Javelina, and lightning.

Seventy-seven percent (n = 69) of the 90 investigations conducted were in response to reports from ranchers and the public and the remaining 23% (n = 21) were in response to reports from the IFT. Eleven percent (n = 7) of the 62 investigations determined to be wolf related were found and reported by the IFT (Table 7).

In total, 26 of the 49 (53%) confirmed depredations, resulting in the death of livestock, involved uncollared wolves not associated with collared packs (Table 7). One wolf, Fox Mountain mp1384 was removed in 2015 for repeated depredations.

The depredation rate for 2015 extrapolates to 50.5 confirmed killed cattle/100 wolves using the number of confirmed killed cattle (n = 49; Table 7) compared to the final population count (n = 97). The 2015 rate is above the previous 17 year recovery program mean of 26.3 confirmed killed cattle/100 wolves/year.

h. Management Actions

In 2015, 41 different wolves were captured and/or removed a total of 42 times. Twenty wolves were captured, collared for the first time, processed, and released on site for routine monitoring purposes by the IFT (Table 8). Eighteen wolves were captured, re-collared, processed and released on site, or simply released on site with the current collar (Table 8). One wolf was captured to receive veterinary care.

Three wolves were captured and removed from the wild pursuant to USFWS approved removal orders. Wolf m1384 from the Fox Mountain pack was removed for repeated livestock depredations (Table 7). Wolves AF1305 and m1336 were removed to deter breeding among siblings and to facilitate pair-bonds with unrelated wolves.

The IFT collared 20 previously uncollared wolves in 2015, including: 11 pups (mp1347, mp1396, fp1397, fp1399, fp1438, mp1440, mp1441, fp1442, fp1444, fp1445, and mp1446), one adult (M1394), and eight subadults (f1395, m1398, m1404, f1405, f1437, f1439, f1443, and m1447). Trapping was also conducted on the FAIR; however, wolf numbers on the FAIR are not provided at the request of the WMAT.

In 2015, the IFT investigated 16 reported instances of nuisance behavior (Table 9). Individual reports could be related to multiple causes (e.g., wolf near a house and in proximity to people). Thus, the investigations were classified as in response to reports of potential wolves: near human dwellings/camps (n = 10), chasing/harassing or near livestock (n = 3), in proximity to people (n = 7). Of the seven instances of potential wolves near humans, two involved interactions with dogs.

Of the 16 reports twelve were likely or known Mexican wolf involvement; tracks near building (n = 1), chasing/harassing livestock (n = 1), near occupied residences (n = 3), chasing livestock near occupied residence (n = 1), close proximity to people and residence (n = 3), following human with dogs or horse on trails (n = 2), dog injury (n = 1). Of these, six involved two collared wolves. Wolf m1350 was involved in two incidences of being in proximity to the same occupied residence. M1130 was reported near a residence in mid-May (Table 9). Over the next 3 days, M1130 was reported near other residences in the same vicinity and was reported on 3 occasions to be in close proximity to people without display of normal fear of people. The IFT's attempts at hazing him from the area during this time were unsuccessful. M1130 was lethally removed for repeated nuisance behavior. Other reported nuisance incidents involved uncollared wolves. Trail cameras, tracking, telemetry, howling, and trapping were used by IFT members during investigations to gather evidence of wolf involvement on reported nuisance problems. Hazing was used to move wolves away from residences and livestock.

i. Proactive Management Activities

The IFT, working with Non-Governmental Organizations (NGO), used proactive management to assist in reducing wolf-livestock conflicts in the BRWRA (Table 10). The Reintroduction Project and NGOs spent approximately $164,500 on proactive management activities affecting an estimated 10 Allotments in Arizona and 12 in New Mexico. The IFT, agency contract employees, and NGO contract employees spent approximately 11,800 hours implementing proactive management activities during 2015.

The agencies and NGOs purchased hay and supplements during the calving season for two ranchers in Arizona and New Mexico to help prevent depredation of livestock. Project personnel met with Forest District Rangers, biologists and range staffs to discuss wolf avoidance livestock management options during the wolf denning season. The IFT coordinated with the Alpine, Clifton, Springerville, Quemado, Wilderness, and Reserve Ranger Districts and stakeholders in Arizona and New Mexico to address potential conflicts between livestock and wolves. In several of these cases, livestock were scheduled to graze in or near pastures where wolves were denning. In pursuing efforts to reduce interactions between livestock and denning wolves, the Districts and livestock producers changed pasture rotations and moved livestock into alternate pastures during the denning season, where possible. The

suggested livestock movements were voluntary for the livestock producers.

During 2015, the Reintroduction Project and NGOs contracted 17 range riders (8 in Arizona, and 9 in New Mexico; Table 10) to assist 20 livestock producers (12 in Arizona, 8 in New Mexico) in monitoring wolves in proximity to cattle. Range riders monitored approximately 30 allotments within 10 wolf pack home ranges, one single wolf home range and one uncollared group of wolves, and provided additional oversight of livestock and light hazing of wolves when they were among livestock. Twenty-four confirmed depredation incidents occurred on monitored allotments while range riders were under contract (Table 10).

The IFT issued radio telemetry equipment to livestock producers (9 in Arizona, 14 in New Mexico) in areas where wolf-livestock conflicts were prevalent. Most of these equipment loans were in association with range riders. The IFT trained livestock producers to use the telemetry equipment to monitor wolves in the vicinity of cattle or residences, and instructed them on non-injurious hazing techniques.

Supplemental food caches are utilized to assist a pack or remnant of a pack in feeding young of the year when extenuating circumstances (such as a death of one of the adults) reduce their own ability to do so. In 2015 no supplemental feeding was required.

Diversionary food caches are utilized to reduce potential conflicts between wolves and livestock, primarily in areas where depredations have occurred in the past. Diversionary food caches were established for six packs during 2015. In New Mexico a total of 7 diversionary food caches were established to reduce depredations within the territories of Luna, Lava, Prieto, and Willow Springs packs. In Arizona a total of two diversionary food caches were established within the Bluestem and Panther Creek pack territories.

j. Non-IFT Wolf Sighting Reports

In 2015, the IFT received a total of 41 wolf sighting reports from the public. The IFT determined 37 reports were non-wolf sightings (coyote, dogs, etc.), and four reports were likely uncollared/unknown wolves. The public is encouraged to report Mexican wolf sightings to help the IFT locate undocumented packs and track movements of wolves within and around the MWEPA, and are provided the 1-888-495-WOLF (9653) number to report Mexican wolf sightings.

k. Uncollared wolf sign

The IFT analyzed unoccupied range, uncollared wolf sign and sighting reports from the public to target 18 areas in Arizona and New Mexico (Fig. 2) in an effort to document and/or radio collar unknown wolves in and around the MWEPA. Nine uncollared wolves in New Mexico and one uncollared wolf in Arizona were documented in 2015 as a result of this effort (Fig 2 – C, K, L, P, and R: Table 11).

l. Public Outreach

The IFT and other project personnel provided a total of 19 presentations and status reports to approximately 2,388 people in federal and state agencies, conservation groups, rural communities, schools, wildlife workshops, and various other public, private, tribal institutions throughout Arizona, New Mexico and White Mountain Apache Tribal lands. Ninety-nine percent of the presentations were for the MWEPA target audience. In addition, biweekly contacts were made to cooperating agencies and stakeholders to inform stakeholders of wolf locations. Project updates were faxed to, or posted at, 41 different individuals/locations on a monthly basis across the MWEPA. Endangered Species Updates containing current project and recovery program information also went out to an average of 19,128 people a month. The AZGFD Mexican wolf website was visited 9,826. The USFWS interactive map was viewed 139 times per month. However the site peak viewing was at a high of 250 views in a 1 month timeframe. Outreach presentations can be scheduled by contacting the IFT at 1-888-495-WOLF (9653).

Utilizing available USFS kiosks and various road pullouts within the MWEPA, the IFT maintained metal signs and laminated posters that provide information on how to minimize conflicts with wolves. The IFT also maintained USFWS reward posters at USFS kiosks and local businesses in the MWEPA as necessary, to provide notice of a $10,000 reward for information leading to the apprehension of individuals responsible for illegal Mexican wolf killings.

Mexican wolf and a black bear at the site of a diversionary food cache. Credit: US Fish and Wildlife Service.

4. Summary

The 2015 end-of-year count confirmed a minimum of 97 wolves, 48 wolves (29 adults, 12 subadults, and 7 pups) of which were equipped with radio-collars. The population consisted of 21 packs (11 in Arizona, 10 in New Mexico). Forty-nine uncollared wolves, including 10 uncollared singles and groups were documented throughout 2015. Thirty-six of the 49 uncollared wolves were associated with 15 packs in which individuals were equipped with radio-collars (Table 1). Three single wolves equipped with radio-collars (M1161, M1331, and M1284) were still alive at year-end and two previously fate unknown wolves (AM1330 and AM1249) were documented alive during the end of year count. There are likely more undocumented free-ranging wolves in the population, but most of these are likely single animals because wolf packs generally leave more sign and their existence/presence is easier to document.

The IFT conducted one initial release and one translocation in 2015. Early in the year the Rim pack consisted of two siblings traveling together (AF1305 and m1336). The IFT captured and placed them into captivity to prevent their breeding with one another. AF1305 was paired in captivity with M1130 from the captive population. AF1305 (translocated) and M1130 (initial released) were soft released together into the Rim Pack territory. The pair split up soon after release. M1130 traveled throughout the MWEPA, and began exhibiting nuisance behavior, and was lethally removed from the population on May 20. AF1305 remained in its territory. On December 14, AF1305 was located dead; cause of death is pending necropsy.

Twelve packs produced wild-conceived, wild-born litters, which represents the 14th consecutive year in which wild-born Mexican wolves bred and raised pups in the wild. In addition, all documented wolves in the population were wild-born. The population benefit of being pups recruited to the population was offset by the 13 mortalities of free-ranging wolves in 2015, including five adults, five subadults, and three pups

Home ranges were calculated for 18 packs or individuals exhibiting territorial behavior. The 95% fixed kernel method produced an average home range size of 376 mi^2 (976 km^2), with home ranges varying from 83 mi^2 to 1673 mi^2 (215 km^2 to 4,333 km^2).

Native prey used by wolves consisted primarily of elk; however, there were also 48 confirmed livestock depredation incidents resulting in 49 cattle killed. In addition, five injured dogs were confirmed to have been caused by wolves.

The IFT captured 41 wolves a total of 43 times for routine monitoring (n = 39) and management actions (n = 2). Additionally, two wolves (m1336 and AF1305) were captured to prevent potential mating between siblings. Two wolves (mp1384 and m1398) were captured twice.

In 2015, the IFT analyzed 41 reports of wolf sightings from the public; 90% of these reports were non-wolf sightings (coyote, dogs, deer, etc.), and 10% were likely uncollared/unknown wolves. The IFT searched 18 areas in and around the MWEPA for new wolf presence, and documented wolves in 5 of those areas.

Project personnel provided 19 presentations and status reports to approximately 2,388 people in

federal and state agencies, conservation groups, rural and urban communities, guide/outfitter organizations, livestock associations, schools, fairs, and various other public and private institutions. In addition, biweekly contacts were made to cooperating agencies and stakeholders. Endangered Species Updates containing current project and recovery program information went out to an average of 19,128 people a month.

The IFT acknowledges the assistance of all agency personnel and volunteers who provided data and support services for the operational field portion of the Mexican wolf reintroduction project during this reporting period. Individuals listed in Appendix C collected data or provided other information for this report.

5. Discussion

The IFT documented a minimum of 97 Mexican wolves in 2015 (Fig. 5; Table 1), and a minimum of 7 breeding pairs (Table 1). However, the minimum total number of pups alive at the end of the year was lower (n = 23; Table 1) than the previous year (n = 39) and pup survival (% of pups alive of the total produced) was 55% at the end of the year. In addition, the number of known mortalities increased from 11 in 2014 to 13 in 2015 (Table 4). However, nine natural pairings resulted in new pairs, packs and breeder replacement that collectively have the significant potential to contribute to reproduction in 2016.

Based on meta-analysis of gray wolf literature, Fuller et al. (2003) identified a 0.34 mortality rate as the inflection point of wolf populations. Theoretically, wolf populations below a 0.34 mortality rate would increase naturally, and wolf populations above a 0.34 mortality rate would decrease. The Mexican wolf population had an overall failure (mortality plus removal plus missing rate) rate of 0.287 in 2015. This failure rate would predict an increasing population which was not the case in 2015. The lack of increase in the population was likely due to a combination of factors rather than just failure rate, which decreased from 0.31 to 0.287 in 2014 and 2015, respectively. For instance, the number of pups recruited dropped from 39 to 23 in 2014 and 2015, respectively. The number of initial releases and translocations also fell from 14 wolves to 2 in 2014 and 2015, respectively. The failure rate remains low largely due to minimal (n = 4) management removals of radio-collared wolves from the population. While the low number of management removals is encouraging for population growth, the majority of the population losses in 2015 were either due to human-caused mortalities or missing animals rather than management removals. It is difficult to determine the effect on the population from missing animals because individuals could still be alive. Five mortalities were human-caused (all five are known or likely illegal mortalities), two were natural, one was killed by other wolves, and five are waiting necropsy results. Efforts to reduce the level of mortality, while replacing the individual animals lost through initial releases and translocations will continue to be a priority. The IFT will also continue to document the uncollared wolf component of the population.

The 2015 confirmed killed cattle rate extrapolates to approximately 50.5 depredations/100 wolves and is higher than the previous 17-year recovery program mean of 26.3 confirmed killed cattle per 100 wolves. It is also the highest recorded since the first year of recovery in 1998. It is important to note the standard for extrapolating the annual confirmed killed cattle rate/100 wolves uses the end of year wolf population count, which does not include wolves that died or

were removed during 2015. Thus, the confirmed killed cattle rate per 100 wolves, as a matter of practice, underestimated the denominator, which inflates the total rate. Nevertheless, the high depredation rate in 2015 is cause for concern. The IFT will implement a variety of methods to attempt to reduce this depredation rate in 2016.

A high number of mortalities may exceed growth from natural recruitment, translocations, and initial releases in a given year. Nonetheless, a combination of initial releases, translocations, natural pair formations, and reproduction next year could result in an increase in the Mexican wolf population. The Reintroduction Project management objective for 2016 is a 10% increase in the minimum wolf population counts and/or the addition of at least two packs that produce a minimum of one pup that survives to December 31, while minimizing negative impacts of wolves. Changes to the Mexican wolf reintroduction project are outlined in the 2015 Final Rule http://www.fws.gov/southwest/es/mexicanwolf/pdf/Mx_wolf_10j_final_rule_to_OFR.pdf. The IFT will continue the implementation of this rule while evaluating its effectiveness during 2016.

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Table 1. Status of Mexican wolf packs in Arizona and New Mexico, as of December 31, 2015.

Pack	Wolf ID	Reproduction[a]	Pups at Year End[b]	No. Collared	No. Uncollared	Min pack Size[c]
Bearwallow, AZ	M1338, F1335	0	0	2	0	2
Buckalou, AZ	M1161[j], f1405	0	0	1	1	2
Bluestem, AZ*	AF1042[j], AM1341, M1330[f], F1333, m1382, f1404, f1443	8	3	5	4	9
Canyon Creek, NM	F1246[f], M1252[f]	0	0	0	0	0
Coronado, NM	M1051[j], f1348[f], m1349[f], m1351[e]	0	0	0	1	1
Dark Canyon, NM*	AF923, AM992, M1293, m1354, m1347, fp1444	3	1	6	1	7
Elk Horn, AZ	AF1294, M1342	0	0	2	0	2
Fox Mountain, NM	AF1212[e], AM1158[j], M1396. m1384[h]	0	0	1	1	2
Hawks Nest, AZ*	AM1038, AF1280[j], m1383, fp1438[e], f1439	5	2	3	3	6
Hoodoo, AZ*	M1290, F1395[f], mp1441	2	1	2	0	2
Iron Creek, NM*	AM1240, AF1278	5	3	2	3	5
Lava, NM	AF1295, AM1285[j], mp1446	1	1	2	1	3
Luna, NM	AF1115[j], AM1155, M1398	0	0	2	2	4
Mangas, NM	M1296	0	0	1	0	1
Marble, AZ*	AF1340, AM1330[j], mp1440, fp1442	5	3	3	2	5
Maverick, AZ	AM1183, AM1291	0	0	2	2	4
Panther Creek, AZ	AF1339, AM1394	1	0	2	0	2
Prieto, NM*	AF1251[j], AM1387[j], m1386, f1392	6	3	3	6	9
Rim, AZ	AF1305[e], M1336[h], M1130[h]	0	0	0	0	0
San Mateo, NM	AF903[e], M1345, f1399[j]	1	1	1	2	3
Willow Springs, NM	AF1279[f], AM1185[e], M1391[f], m1385[e], f1390[e], f1397	0	0	1	0	1
Radio collared wolf, AZ	f1332[e]	0	0	0	0	0
Radio collared wolf, NM	M1337[f]	0	0	0	0	0
Radio collared wolf, NM	M1282[f]	0	0	0	0	0
Radio collared wolf, NM	M1284	0	0	1	0	1
Radio collared wolf, NM	M1331	0	0	1	0	1
Radio collared wolf, NM	m1350[f]	0	0	0	0	0
Uncollared wolf, AZ	m1450[e]	0	0	0	0	0
Weimer Canyon, AZ	Uncollared wolf	0	0	0	1	1
Laguna Abel, NM	Uncollared wolf	0	0	0	1	1
San Mateo Mountains, NM	Uncollared wolves	0	0	0	3	3
Pueblo Creek, NM	Uncollared wolves	0	0	0	4	4
Boiler Peak, NM	Uncollared wolf	0	0	0	1	1

Pack	Wolf ID	Reproduction[a]	Pups at Year End[b]	No. Collared	No. Uncollared	Min pack Size[c]
FAIR	Uncollared wolves	N/A[d]	N/A[d]	N/A[d]	N/A[d]	N/A[d]
SCAR	Uncollared wolves	N/A[d]	N/A[d]	N/A[d]	N/A[d]	N/A[d]
Totals[l]		42	23	48	49	97

Table 1. Continued.

[a] Reproduction-maximum number of pups documented in 2015.

[b] Pups at year end documented surviving until December 31, 2015.

[c] Min pack size-total number of wolves (collared, uncollared, pups) documented at year end.

[d] Wolf numbers on FAIR and SCAR are not displayed at the request of the tribes.

[e] Died during 2015.

[f] Fate unknown during 2015.

[g] Radio collared wolf not missing for 3 months, but not located nor believed alive by IFT through December 31, 2015.

[h] Removed from wild for management purposes during 2015.

[i] Dispersed and joined existing pack.

[j] Radio collar no longer functions; but, documented alive through December 31, 2015.

[l] Totals include wolves occurring on FAIR and SCAR.

*A pack that meets the definition of a breeding pair.

Table 2. Mexican wolves initial released or translocated from captivity or the wild in Arizona and New Mexico during January 1 – December 31, 2015.

Wolf pack	Wolf #	Release Site	Release Date	Released or Translocated
Rim	AF1305	Fish Bench	April 24	Translocated
Rim	M1130	Fish Bench	April 24	Released

Table 3. Home range sizes of free-ranging Mexican wolf packs in Arizona and New Mexico, January 1 – December 31, 2015.

Pack	Home range size mi^2 (km^2)	Number of independent locations	Availability of radio locations during 2014
Bluestem	223 (578)	366	12 Months
Buckalou	432 (1120)	231	11 Months
Dark Canyon	226 (586)	136	12 Months
Diamond	465 (1203)	124	8 Months
Elk Horn	130 (338)	68	12 Months
Fox Mountain	1673 (4333)	37	12 Months
Hawks Nest	83 (215)	278	12 Months
Hoodoo	599 (1550)	127	12 Months
Iron Creek	110 (285)	161	12 Months
Lava	255 (794)	95	12 Months
Luna	295 (660)	95	12 Months
Marble	256 (664)	134	10 Months
Maverick	424 (1099)	25	12 Months
Panther Creek	154 (399)	86	10 Months
Prieto	196 (508)	106	12 Months
San Mateo	502 (1299)	42	12 Months
Tsay-O-Ah	340 (886)	105	12 Months
Willow Springs	407 (1055)	251	12 Months
Average[a]	**376 (976)**	**137**	**11.5 Months**

[a]Averages were based on packs with enough locations to calculate home ranges.

Table 4. Wild Mexican wolf mortalities documented in Arizona and New Mexico, 1998-2015.

Year	Illegal Mortality[a]	Vehicle collision	Natural[b]	Other[c]	Unknown	Awaiting necropsy	Annual Total
1998	4	0	0	1	0	0	5
1999	0	1	2	0	0	0	3
2000	2	2	1	0	0	0	5
2001	4	1	2	1	1	0	9
2002	3	0	0	0	0	0	3
2003	7	4	0	0	1	0	12
2004	1	1	1	0	0	0	3
2005	3	0	0	0	1	0	4
2006	1	1	1	1	2	0	6
2007	2	0	1	0	1	0	4
2008	7	2	2	0	2	0	13
2009	4	0	4	0	0	0	8
2010	5	0	1	0	0	0	6
2011	3	2	3	0	0	0	8
2012	4	0	0	0	0	0	4
2013	5	0	0	2	0	0	7
2014	7	1	3	0	0	0	11
2015	5	0	2	1	0	5	13
Total	**67**	**15**	**23**	**6**	**8**	**5**	**124**

[a]Illegal mortality causes of death may include, but are not limited to known or suspected illegal shooting with a firearm or arrow, and public caused trap related mortalities.
[b]Natural causes of death may include, but are not limited to predation, starvation, interspecific strife, lightening, and disease.
[c]Other causes of death include capture-related mortalities and legal shootings by the public.

Table 5. Mexican wolf mortalities documented in Arizona and New Mexico during January 1 - December 31, 2015.

Wolf ID	Pack	Age (years)	Date Found	Cause of Death
AF1212	Fox Mountain	3	January 27	Illegal mortality
AF1279	Willow Springs	≥5	February 13	Awaiting necropsy
f1332	Single	1	February 17	Illegal mortality
mp1385	Willow Springs	<1	February 17	Illegal mortality
f1388	Tse ighan lige (Diamond)	1	March 17	Illegal mortality
fp1389	Tse ighan lige (Diamond)	<1	March 24	Awaiting necropsy
fp1438	Hawks Nest	<1	September 4	Capture related mortality
f1390	Willow Springs	1	September 8	Illegal mortality
AF903	San Mateo	≥13	November 30	Intraspecific strife
AF1305	Rim	3	December 14	Awaiting necropsy
m1450	Single	1	December 19	Awaiting necropsy
AM1185	Willow Springs	6	December 27	Natural
m1351	Coronado	1	December 28	Awaiting necropsy

Table 6. Mexican wolf depredations of livestock documented in Arizona and New Mexico during January 1 – December 31, 2015.

	Confirmed	**Probable**	**Total**
Fatal	49	5	54
Injury	8	0	8

Table 7. Investigations of confirmed and probable depredations and injuries caused by Mexican wolves to livestock and dogs during 2015 in New Mexico and Arizona. Depredation incidents are defined as the aggregate number of livestock confirmed killed or mortally wounded by an individual wolf or a single pack of wolves at a single location within a 1-day (24-hour) period, beginning with the first confirmed kill, as documented in the initial IFT incident investigation pursuant to SOP 11.0. Number of depredation incidents on a given wolf at a given point in time is calculated based on the number of incidents in the preceding 365 days.

	Wolves in Area	Investigation Date	Located By IFT	Species	State	# Killed/ # Injured	Call	Wolves Responsible	Depredation Incident	No. of Incidents	Management Action
1	Prieto	1/25/2015	No	Cattle	NM	1 Killed	Confirmed	Prieto	Yes	1	Increased monitoring
2	Prieto	1/25/2015	No	Cattle	NM	1 Killed	Probable		No		Increased monitoring
3	Unknown	2/4/2015	No	Cattle	NM	1 Killed	Confirmed	Uncollared (1-2)	Yes	1	Remote cameras deployed in area
4	Uncollared	2/10/2015	No	Cattle	NM	1 Killed	Confirmed	Uncollared wolf	Yes	1	Increased monitoring
5	Uncollared	2/12/2015	No	Cattle	NM	1 Killed	Confirmed	Uncollared wolf	Yes	1	Increased communications with livestock producer
6	Fox Mountain	2/14/2015	No	Cattle	NM	1 Killed	Confirmed	Fox Mountain mp1384, mp1396, uncollared pup	Yes	1	Increased monitoring
7	Unknown	2/18/2015	No	Dog	NM	1 Injured	Confirmed	Uncollared member of Willow Springs pack	No		No action, interaction took place in unknown area of National Forest
8	Uncollared	2/26/2015	No	Cattle	NM	1 Killed	Confirmed	Uncollared	Yes	1	Increased monitoring in area for collared wolves
9	M1161	2/28/2015	No	Cattle	NM	1 Killed	Confirmed	M1161	Yes	1	Increased monitoring and attempted hazing
10	Uncollared	2/28/2015	No	Cattle	NM	1 Killed	Confirmed	Uncollared wolves	Yes	1	Increased monitoring of neighboring packs
11	Fox Mountain mp1384 and uncollared pup	2/28/2015	No	Cattle	NM	1 Killed	Confirmed	Fox Mountain mp1384 and uncollared pup	Yes	2	Increased monitoring, attempted hazing, began negotiation for range rider
12	M1161	2/28/2015	Yes	Cattle	NM	1 Killed	Confirmed	M1161	Yes	2	Increased monitoring and attempted hazing
13	Fox Mountain	2/28/2015	Yes	Cattle	NM	1 Killed	Probable	mp1384 and uncollared pup	No		Increased monitoring, attempted hazing, began negotiation for range rider
14	Fox Mountain pups (1384, 1396, 1 uncollared)	3/3/2015	Yes	Cattle	NM	1 Killed	Confirmed	Fox Mountain mp1384, mp1396, uncollared pup	Yes	(3) mp1384 and uncollared pup, (2) mp1396	USFWS removal order issued for either mp1384, mp1396, or an uncollared pup. Trapping efforts began. Range rider arranged but had not started
15	M1161	3/3/2015	Yes	Cattle	NM	1 Killed	Confirmed	m1161	No	Considered same depredation incident as 2-28-15 calf	Increased monitoring and attempted hazing

	Wolves in Area	Investigation Date	Located By IFT	Species	State	# Killed/ # Injured	Call	Wolves Responsible	Depredation Incident	No. of Incidents	Management Action
16	fox mountain uncollared pup	3/6/2015	No	Cattle	NM	1 Killed	Confirmed	Uncollared likely associated with the Fox Mountain pack	Yes	4	Trapping continued in association with removal order. Range rider arranged but had not started
17	Fox Mountain pups (1384, 1396, 1 uncollared)	3/8/2015	No	Cattle	NM	1 Killed	Confirmed	Fox Mountain mp1384, mp1396, uncollared pup	Yes	(4) mp1384, (5) uncollared pup, (3) mp1396	Trapping continued in association with removal order. Range rider arranged but had not started
18	Uncollared	3/13/2015	No	Dog	NM	1 Injured	Confirmed	Uncollared	No		No action, unknown where wolf interaction occurred.
19	Uncollared	3/17/2015	No	Cattle	NM	4 Injured	2 Confirmed, 2 Unknown	Uncollared	No		Remote cameras in area, continued intensive monitoring of neighboring wolf packs
20	Uncollared	3/19/2015	No	Dog	NM	1 Injured	Confirmed	uncollared	No		Remote cameras in area, continued intensive monitoring of neighboring wolf packs
21	Uncollared	3/24/2015	No	Cattle	AZ	1 Killed	Confirmed	uncollared	Yes	1	Investigated area for wolf sign. Found none. Placed one trail camera in area. No pictures.
22	Willow springs	3/27/2015	No	Cattle	NM	1 Killed	Confirmed	AM1185, fp1390	Yes	1	Increased monitoring
23	Fox Mountain	3/30/2015	No	Cattle	NM	1 Killed	Confirmed	Fox Mountain	Yes	(1) 1158, (5) mp1384, (6) uncollared pup, (4) mp1396	No additional action, carcass was old and possibly occurred prior to completion of removal order
24	Uncollared	3/30/2015	No	Cattle	AZ	1 Killed	Confirmed	Uncollared	Yes	1	Train camera placed at carcass. No wolf pictures obtained. Checked area for collared wolves. None found.
25	Uncollared	4/4/2015	No	Cattle	AZ	1 Killed	Confirmed	Uncollared	Yes	1	Sign search of area. No tracks found. No collared wolves in area.
26	Fox Mountain	4/6/2015	No	Cattle	NM	1 Killed	Confirmed	Fox Mountain	Yes	(2)1158, (6) 1384, (7)uncollared pup, (5) mp1396	No additional action, carcass was old and possibly occurred prior to completion of removal order
27	Willow Springs	4/6/2015	No	Cattle	NM	1 Killed	Confirmed	AM1185 or uncollared pup	Yes	(2) AM1185 or (1) uncollared pup	Increased monitoring and hazing
28	Luna	4/11/2015	No	Cattle	NM	1 Killed	Confirmed	Luna juveniles (1-2)	Yes	1	Increased monitoring

	Wolves in Area	Investigation Date	Located By IFT	Species	State	# Killed/ # Injured	Call	Wolves Responsible	Depredation Incident	No. of Incidents	Management Action
29	Uncollared	4/20/2015	No	Cattle	NM	1 Killed	Confirmed	Uncollared wolves possibly associated with Fox Mountain pack	Yes	(1)uncollared wolves or (8) uncollared wolf associated with Fox Mountain	Two food caches started with cameras to aid in determination of uncollared pair of wolves in area
30	Uncollared	4/20/2015	No	Cattle	AZ	1 Injured	Confirmed	Uncollared	yes	1	Increased monitoring
31	Uncollared	4/22/2015	No	Cattle	NM	1 Killed	Confirmed	Uncollared wolf	Yes	1	Increased monitoring/presence in area
32	Uncollared	5/5/2015	No	Cattle	AZ	1 Killed	Confirmed	Uncollared wolf or wolves	yes	1	Increased monitoring
33	Uncollared	5/8/2015	No	Cattle	AZ	1 Killed	Confirmed	Uncollared	yes	1	Increased monitoring
34	Uncollared	5/10/2015	No	Cattle	NM	2 Killed	Confirmed	Uncollared wolf or wolves	Yes	1	Traps set in area in an effort to collar wolf or wolves responsible
35	Uncollared	5/10/2015	No	Cattle	NM	1 Killed	Confirmed	Uncollared wolf	Yes	1	Increased sign search in area
36	Lava	5/17/2015	No	Cattle	NM	1 Killed	Confirmed	Lava M1285	Yes	1	Diversionary food cache set up in effort to reduce potential of future depredations
37		5/20/2015	No	Cattle	AZ	1 Killed	Confirmed	Uncollared	yes	1	Increased monitoring
38	Uncollared	5/21/2015	No	Cattle	NM	1 Killed	Confirmed	Uncollared wolf or wolves	Yes	1	Increased sign search in area
39	Uncollared	5/28/2015	No	Cattle	AZ	4 injured	Confirmed	Uncollared	No	1	Increased monitoring
40	Uncollared	6/1/2015	No	Cattle	NM	1 Killed	Confirmed	Uncollared	Yes	1	Cameras deployed in area and increased sign search in area
41	Uncollared	6/4/2015	No	Cattle	NM	1 Killed	Confirmed	Uncollared wolf or wolves	Yes	2	Increased sign search in area and monitoring of neighboring packs
42	Uncollared	6/4/2015	No	Cattle	NM	1 Killed	Probable	Uncollared wolf or wolves	No		Increased sign search in area and monitoring of neighboring packs
43	Uncollared	6/4/2015	No	Cattle	NM	1 Killed	Probable	Uncollared wolf or wolves	No		Increased sign search in area and monitoring of neighboring packs
44	Iron Creek	6/16/2015	No	Dog	NM	1 Injured	Confirmed	Iron Creek M1240	No		
45	Uncollared	6/16/2015	No	Cattle	NM	1 Killed	Confirmed	Uncollared wolf potentially associated with the Luna Pack	Yes	2	Increased monitoring
46	Marble	6/21/2015	No	Cattle	AZ	1 Killed	Confirmed	Marble	Yes	1	Set out food cache and monitored wolves
47	Uncollared	6/27/2015	No	Cattle	NM	1 Killed	Confirmed	Uncollared	Yes	2	Additional cameras placed in area and continued sign search

	Wolves in Area	Investigation Date	Located By IFT	Species	State	# Killed/ # Injured	Call	Wolves Responsible	Depredation Incident	No. of Incidents	Management Action
48	Lava	7/12/2015	No	Cattle	NM	1 Killed	Confirmed	Lava pack	Yes	(2)AM1285, (1) AF1295	Additional food cache placed in area of den (bears were monopolizing original food cache)
49	Lava	7/13/2015	No	Cattle	NM	1 Killed	Confirmed	Lava pack	No	Considered same depredation incident as 7-12-15	Additional food cache placed in area of den (bears were monopolizing original food cache)
50	Uncollared	7/29/2015	No	Cattle	NM	1 Killed	Confirmed	Uncollared	Yes	3	Additional sign search and continuation of food caches
51	Uncollared	8/23/2015	yes	Cattle	AZ	1 Killed	Confirmed	uncollared		1	Uncollared sign search and trapping effort. No wolves caught or observed.
52	Bluestem	8/31/2015	No	Cattle	AZ	1 Killed	Confirmed	Bluestem	Yes	1	Food cache and monitoring.
53	Bluestem	9/1/2015	yes	Cattle	AZ	1 Killed	Probable	Bluestem	No		Food cache, monitoring and hazing
54	Bluestem	9/4/2015	yes	Cattle	AZ	1 Killed	Confirmed	Bluestem	Yes	1	Food cache, monitor, hazing
55	Uncollared	9/8/2015	no	Cattle	AZ	1 Killed	Confirmed	uncollared	Yes	1	Monitoring
56	Uncollared	10/4/2015	no	Cattle	AZ	1 Killed	Confirmed	Uncollared	Yes	1	Monitoring, uncollared sign search.
57	m1396	10/13/2015	No	Cattle	NM	1 Killed	Confirmed	Fox Mountain m1396	Yes	6	
58	Uncollared	10/23/2015	No	Dog	NM	1 Injured	Confirmed	Unknown Uncollared wolf	No		No action, unknown where wolf interaction occurred.
59	Uncollared	11/8/2015	No	Cattle	NM	1 Killed	Confirmed	Unknown Uncollared wolf	Yes	1	Sign search of area. No tracks found. No collared wolves in area.
60	Uncollared	12/2/2015	No	Cattle	NM	1 Killed	Confirmed	Uncollared	Yes	2	Increased sign search including deployment of remote cameras.
61	Uncollared	12/2/2015	No	Cattle	NM	1 Injured	Confirmed	Uncollared	No		Increased sign search including deployment of remote cameras.
62	Prieto	12/29/2015	No	Cattle	NM	1 Killed	Confirmed	Prieto (not f1392)	Yes	(2) AF1251, AM1387, m1386 and (1) pups of the year	Increased monitoring

Table 8. Mexican wolves captured in Arizona and New Mexico from January 1 – December 31, 2015.

	Pack	Wolf ID	Capture Date	Reason for Capture
1	Elk Horn	M1342	January 18	Helicopter capture. Routine monitoring purposes. Captured, re-collared, and released on site.
2	Bluestem	m1382	January 18	Helicopter capture. Routine monitoring purposes. Captured, re-collared, and released on site.
3	Panther Creek	M1394	January 18	Helicopter capture. Routine monitoring purposes. Captured, collared, and released on site.
4	Bluestem	AF1042	January 20	Helicopter capture. Routine monitoring purposes. Captured, re-collared, and released on site.
5	Hawks Nest	AF1280	January 20	Helicopter capture. Routine monitoring purposes. Captured, re-collared, and released on site.
6	Bluestem	m1331	January 20	Helicopter capture. Veterinary care.
7	Hoodoo	f1395	January 20	Helicopter capture. Routine monitoring purposes. Captured, collared, and released on site.
8	Single	M1161	January 22	Helicopter capture. Routine monitoring purposes. Captured, re-collared, and released on site.
9	Rim	AF1305	January 22	Helicopter capture. Removed from the wild to prevent sibling breeding. Transported to Sevilleta to facilitate pair bonding.
10	Fox Mountain	mp1384	February 02	Helicopter capture. Routine monitoring purposes. Captured, re-collared, and released on site.
11	Fox Mountain	mp1396	February 02	Helicopter capture. Routine monitoring purposes. Captured, re-collared, and released on site.
12	Willow Springs	fp1397	February 02	Helicopter capture. Routine monitoring purposes. Captured, collared, and released on site.
13	Dark Canyon	mp1347	February 03	Helicopter capture. Routine monitoring purposes. Captured, collared, and released on site.
14	Luna	m1398	February 03	Helicopter capture. Routine monitoring purposes. Captured, collared, and released on site.
15	Luna	AF1115	February 04	Helicopter capture. Routine monitoring purposes. Captured, re-collared, and released on site.
16	Rim	m1336	February 04	Helicopter capture. Removed from the wild to prevent sibling breeding. Transported to Sevilleta to facilitate pair bonding.
17	Luna	M1285	February 05	Helicopter capture. Routine monitoring purposes. Captured, re-collared, and released on site.
18	Fox Mountain	AM1158	February 06	Helicopter capture. Routine monitoring purposes. Captured, re-collared, and released on site.
19	Prieto	AF1251	February 06	Helicopter capture. Routine monitoring purposes. Captured, re-collared, and released on site.
20	San Mateo	fp1399	February 06	Helicopter capture. Routine monitoring purposes. Captured, collared, and released on site.
21	Fox Mountain	mp1384	March 12	Management trapping. Removed from the wild in accordance with USFWS Removal Order
22	Elk Horn	AF1294	April 09	Routine monitoring purposes. Captured, re-collared and released on site.
23	Bluestem	m1404	May 19	Routine monitoring purposes. Captured, collared and released on site.
24	Bluestem	f1405	May 22	Routine monitoring purposes. Captured, collared and released on site.
25	Hawks Nest	m1383	May 24	Routine monitoring purposes. Captured, re-collared and released on site.
26	Diamond	f1437	August 06	Routine monitoring purposes. Captured, collared and released on site.
27	Hawks Nest	fp1438	August 21	Routine monitoring purposes. Captured, collared and released on site.
28	Hawks Nest	f1439	August 22	Routine monitoring purposes. Captured, collared and released on site.
29	Marble	mp1440	August 31	Routine monitoring purposes. Captured, collared and released on site.
30	Iron Creek	AF1278	September 23	Routine monitoring purposes. Captured, re-collared and released on site.
31	Iron Creek	AM1240	September 26	Routine monitoring purposes. Captured, re-collared and released on site.
32	Hoodoo	mp1441	September 29	Routine monitoring purposes. Captured, collared and released on site.
33	Marble	fp1442	September 29	Routine monitoring purposes. Captured, collared and released on site.
34	Bluestem	f1443	October 07	Routine monitoring purposes. Captured, collared and released on site.

	Pack	Wolf ID	Capture Date	Reason for Capture
35	Dark Canyon	fp1444	October 10	Routine monitoring purposes. Captured, collared and released on site.
36	Tsay-O-Ah	fp1445	October 11	Routine monitoring purposes. Captured, collared and released on site.
37	Dark Canyon	AF923	October 12	Routine monitoring purposes. Captured, re-collared and released on site.
38	Prieto	f1392	October 18	Routine monitoring purposes. Captured, re-collared and released on site.
39	Lava	mp1446	October 19	Routine monitoring purposes. Captured, collared and released on site.
40	Panther Creek	M1394	October 23	Routine monitoring purposes. Captured, re-collared and released on site.
41	Diamond	m1447	October 30	Routine monitoring purposes. Captured, collared and released on site.
42	Luna	m1398	October 31	Routine monitoring purposes. Captured, re-collared and released on site.

Table 9. IFT management actions resulting from reported cases of potential Mexican wolf nuisance activities in Arizona and New Mexico during 2015.

Date	Wolf ID	General Location	Type of Activity	IFT Response	Management Result
January 18		Datil, NM	Possible wolf tracks near livestock and near buildings.	IFT investigated, scanned for missing and dispersing wolves- no signals heard and determined tracks were not wolf tracks	
January 22	Unknown	Jim Smith Peak, NM	Wolf tracks on private property near building.	IFT investigated and confirmed one set of wolf tracks and scanned for collared wolves. No collared wolves in area.	
February 4		Deadman Allotment, NM	Possible uncollared wolf interaction with dogs and human.	IFT investigated and found dog, coyote and possible wolf tracks and collected biological samples (scat, hair and swabs from knife and coat) at the interaction site. The IFT flew an aerial grid from a helicopter and trail cameras were placed at the interaction site.	DNA evidence at the scene was inconclusive pertaining to the human interaction. Hair and scat samples were confirmed as coyote. Trail camera photos contained no wolves. IFT set up and maintained a remote camera grid in a larger area in efforts to document unknown uncollared wolves, only photos of known wolves and coyotes (1-4) were captured.
March 11		Turner Peak, NM	Two possible uncollared wolves in close proximity to humans on National Forest.	IFT received report from a third party and was unable to speak to reporting party. IFT placed remote cameras in area.	No photos of wolves were obtained.
March 19	Unknown	Collins Park, NM	Two dogs interacting with wolf; one dog injured.	IFT investigated and confirmed wounds on the dog were caused a wolf.	IFT monitored the area and maintained remote cameras.
April 6	Unknown	Blue River, AZ	Wolves reported chasing horses through fence.	IFT investigated and found no sign of wolves in area.	No other incidents or any depredations reported.
April 7		Overgaard, AZ	Possible wolf/wolves in driveway of residence.	IFT talked to reporting party and both concluded animals in driveway were not wolves	
April 8	m1350	Plains of San Augustin, NM	Wolf in close proximity to residence.	IFT talked to reporting party and determined photos were of m1350.	None, wolf had left area on its own.
April 14	m1350	Plains of San Augustin, NM	Wolf in close proximity to residence.	IFT investigated and documented m1350 in area.	IFT set up fladry, monitored and hazed m1350; wolf left the area.
May 17	M1130	Eagle Peak, NM	Wolf in close proximity to residence.	IFT tried to contact reporting party but not successful. Talked and investigated the following day. Tracks in the area. The wolf had apparently been near the camp trailer for some period of time. A dog was also present but the private individual was able to get the dog into the trailer after seeing the wolf.	None, wolf had left area on its own.
May 18	M1130	Centerfire, NM	Wolf in close proximity to people and residence.	Investigated by IFT. IFT initiated hazing and attempted to trap M1130; it stayed with in vicinity of building for 3 days.	USFWS issued a lethal removal order which was carried out on May 20.
May 19	M1130	Centerfire, NM	Wolf in close proximity to people and residence.	M1130 continues presence, IFT continues hazing and trapping.	USFWS issued a lethal removal order which was carried out on May 20.

Date	Wolf ID	General Location	Type of Activity	IFT Response	Management Result
May 20	M1130	Centerfire, NM	Wolf in close proximity to people and residence.	M1130 continues presence, IFT continues hazing and trapping.	USFWS issued a lethal removal order which was carried out on May 20.
July 2	Unknown	Jewet Gap, NM	Collared wolf near occupied residence and chasing livestock on private property.	IFT talked to reporting party but were not granted access to private property to investigate. IFT searched for collared wolves and wolf sign, and placed trail camera on National Forest areas surrounding private property.	
July 27	Unknown	Mimbres, NM	Wolves interacting/harassing dogs while walking with owner on Forest Service trail. Wolves followed group back to private property/house.	IFT investigated incident and documented wolf tracks and scat in area of interaction. Trail cameras were also placed in the area.	Site revisited. No photos of wolves on trail camera and only old wolf sign found. No further incidents occurred or reported.
August 5	Unknown	Murry Basin, AZ	Wolves following person on horseback on Forest Service trail.	IFT investigated and did not locate any collared wolves in area.	

Table 10. IFT proactive management activities in Arizona and New Mexico during 2015.

Proactive Management	Purpose	Date	Location	Wolf ID	Management Result
Hay	Reduce livestock depredations.	Calving season	Blue River, AZ	Uncollared wolves	No confirmed depredations
Supplements	Reduce livestock depredations.	Calving season	Springerville, AZ	Hawks Nest	No known depredations
Range Rider	Reduce depredations on free-ranging livestock	10 months	Greens Peak, AZ	Paradise	No known depredations
Range Rider	Reduce depredations on free-ranging livestock	3 months	Greens Peak, AZ	Paradise	No known depredations
Range Rider	Reduce depredations on free-ranging livestock	5 months	Blue River, AZ	Bluestem, Elk Horn	1 known depredations
Range Rider	Reduce depredations on free-ranging livestock	6 months	Strayhorse, AZ	Unknown	N6 known depredations
Range Rider	Reduce depredations on free-ranging livestock	4 months	Rudd Knoll, AZ	Hawks Nest	No known depredation
Range Rider	Reduce depredations on free-ranging livestock	4 months	Greer, AZ	Hawks Nest/Bluestem	No Known Depredations
Range Rider	Reduce depredations on free-ranging livestock	5 months	O Bar O Canyon West, NM	Canyon Creek	5 confirmed depredations
Range Rider	Reduce depredations on free-ranging livestock	5 months	Aragon, NM	San Mateo	1 known depredations
Range Rider	Reduce depredations on free-ranging livestock	5 months	Slaughter Mesa, NM	San Mateo	No Known Depredations
Range Rider	Reduce depredations on free-ranging livestock	9 months	Centerfire Bog, NM	Fox Mountain, Uncollared wolves	5 confirmed depredations
Range Rider	Reduce depredations on free-ranging livestock	6.5 months	Black Peak, NM	Fox Mountain, Uncollared wolves	2 confirmed depredation
Range Rider	Reduce depredations on free-ranging livestock	5 months	Cruzville, NM	Fox Mountain	No Known Depredations
Range Rider	Reduce depredations on free-ranging livestock	5 months	Cruzville, NM	Fox Mountain	No Known Depredations
Hay	Reduce livestock depredations.	Calving Season	Cruzville, NM	Luna	No Known Depredations
Range Rider	Reduce depredations on free-ranging livestock	5 months	Collins Park, NM	Luna	No known depredation
Range Rider	Reduce depredations on free-ranging livestock	6 months	Govina, NM	Willow Springs	4 confirmed depredations

Table 11. Areas searched and uncollared wolves documented by the IFT in Arizona and New Mexico during 2015.

Area ID	General Area	Effort	State	Number Documented
A	Reynolds Creek south of Young	Searched roads and trails for wolf sign	AZ	0
B	Dry Creek area north of Young	Searched roads and trails for wolf sign	AZ	0
C	Clear Water Creek area northeast of Strawberry	Deployed remote cameras and searched roads and trails for wolf sign	AZ	1
D	Wilkins Creek area northwest of Forest Lakes	Searched roads and trails for wolf sign	AZ	0
E	Chevelon Canyon complex area north of Forest Lakes	Deployed remote cameras and searched roads and trails for wolf sign	AZ	0
F	Canyon Creek complex area south of Forest Lakes	Deployed remote cameras, conducted howling surveys, and searched roads and trails for wolf sign	AZ	0
G	Cotton Ridge area south of Pinedale	Deployed remote cameras and searched roads and trails for wolf sign	AZ	0
H	Mallory Spring area southeast of Vernon	Deployed remote cameras and searched roads and trails for wolf sign	AZ	0
I	Greens Peak area northwest of Greer	Deployed remote cameras and searched roads and trails for wolf sign	AZ	0
J	Strayhorse area south of Blue Vista Scenic Overlook	Deployed remote cameras and searched roads and trails for wolf sign	AZ	0
K	Chimney Rock	Deployed remote cameras and searched roads and trails for wolf sign	NM	4
L	Centerfire Creek/San Francisco Mountains	Deployed remote cameras and searched roads and trails for wolf sign	NM	0
M	Laguna Abel	Survey for wolf sign. IFT followed up on public report and confirmed wolf track.	NM	1
N	Tribal lands	IFT assisted tribal biologist searching roads for wolf sign.	NM	0
O	Datil Mountains	Searched roads and trails for wolf sign	NM	0
P	North San Mateo Mountains	Searched roads and trails for wolf sign	NM	3
Q	South San Mateo Mountains	Searched roads and trails for wolf sign	NM	0
R	Boiler Peak	Searched roads and trails for wolf sign	NM	1

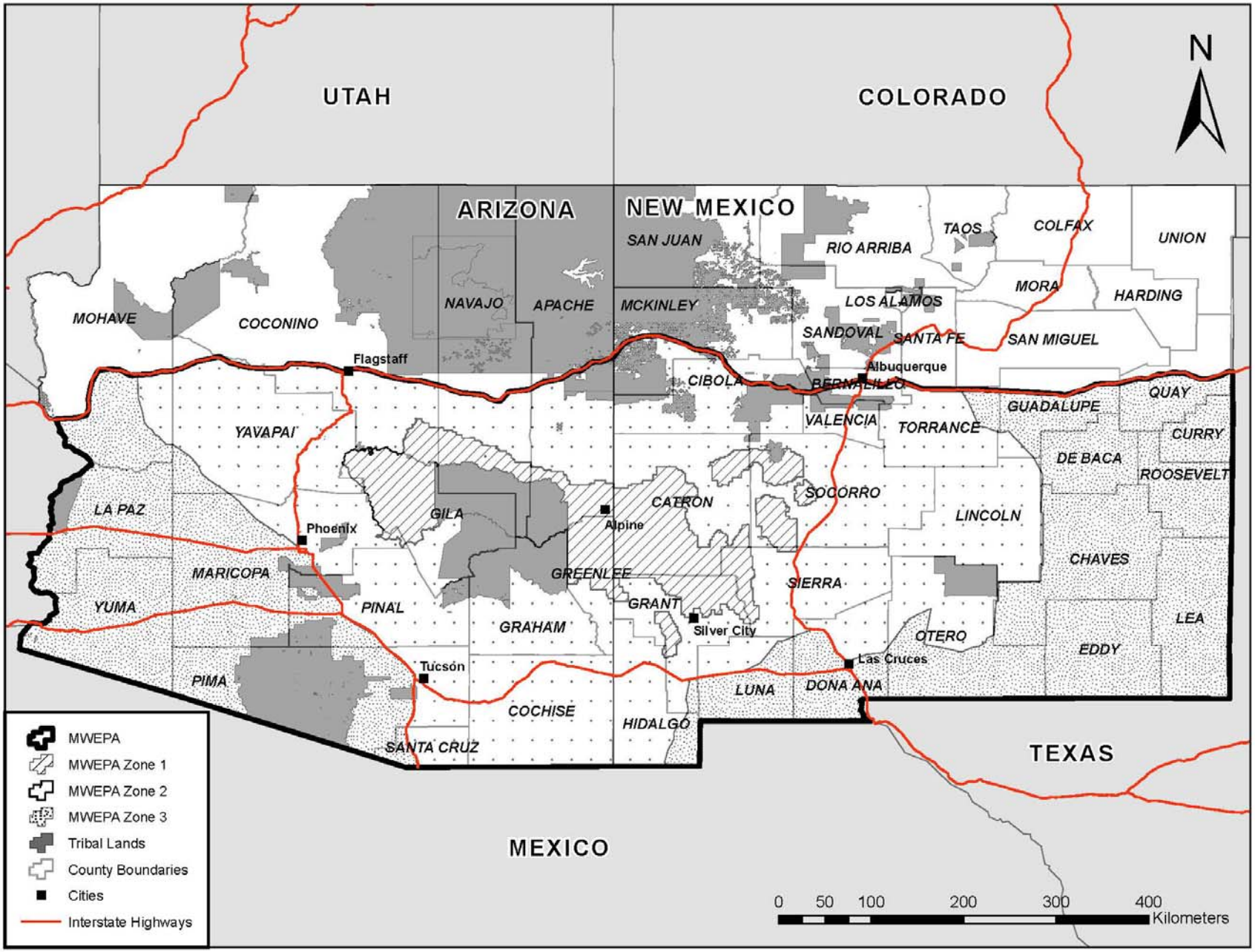

Figure 1. The Mexican Wolf Experimental Population Area (MWEPA) and Zones 1-3 in Arizona and New Mexico as described in the 2015 Final Rule found at http://www.fws.gov/southwest/es/mexicanwolf/pdf/Mx_wolf_10j_final_rule_to_OFR.pdf.

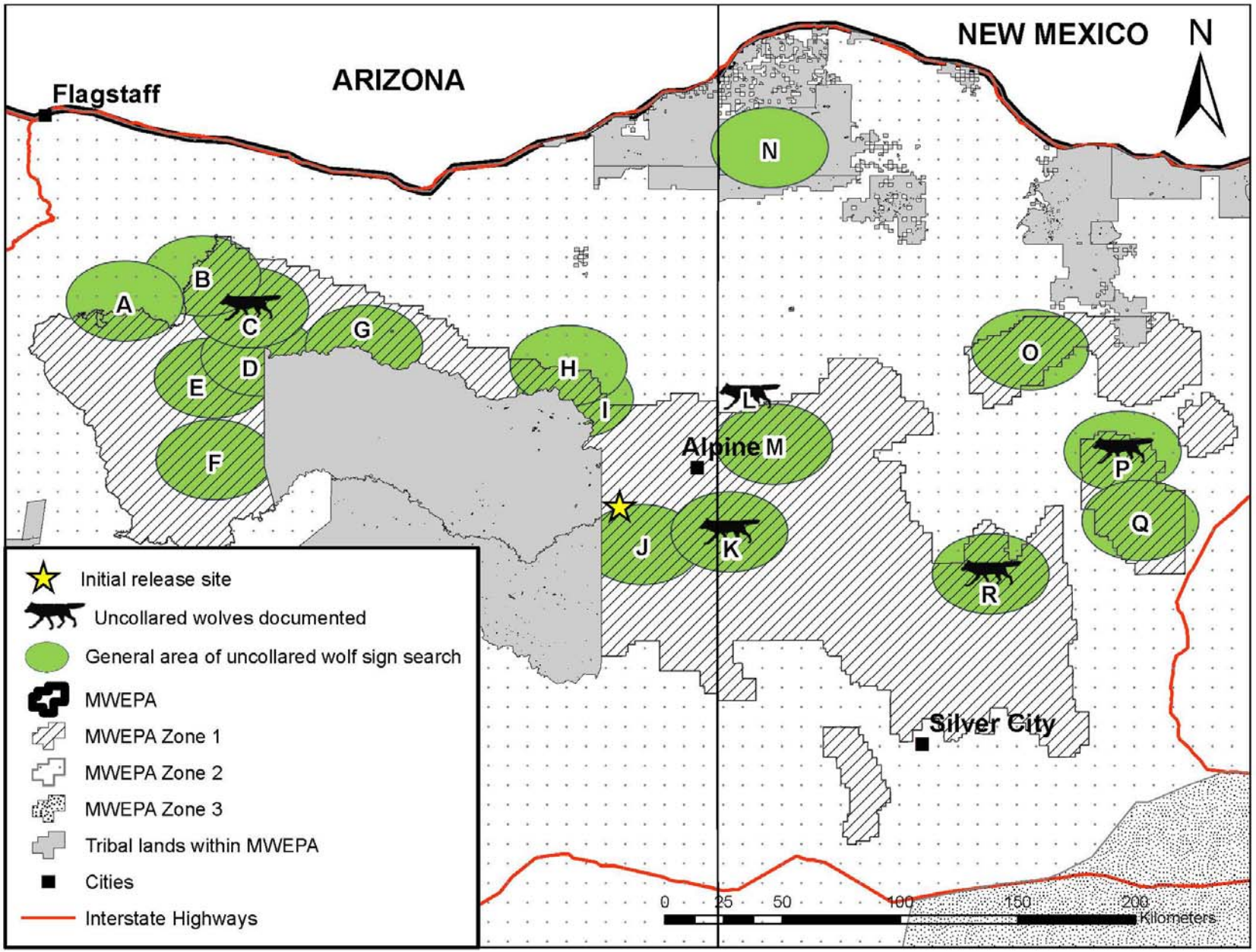

Figure 2. Areas searched for uncollared wolf sign (with uncollared wolves documented and counted in the 2015 wolf population designated) within the Mexican Wolf Experimental Population Area (MWEPA). Search areas correspond with map letters found in Table 11. One initial release site was used during 2015 in Arizona and New Mexico within the MWEPA.

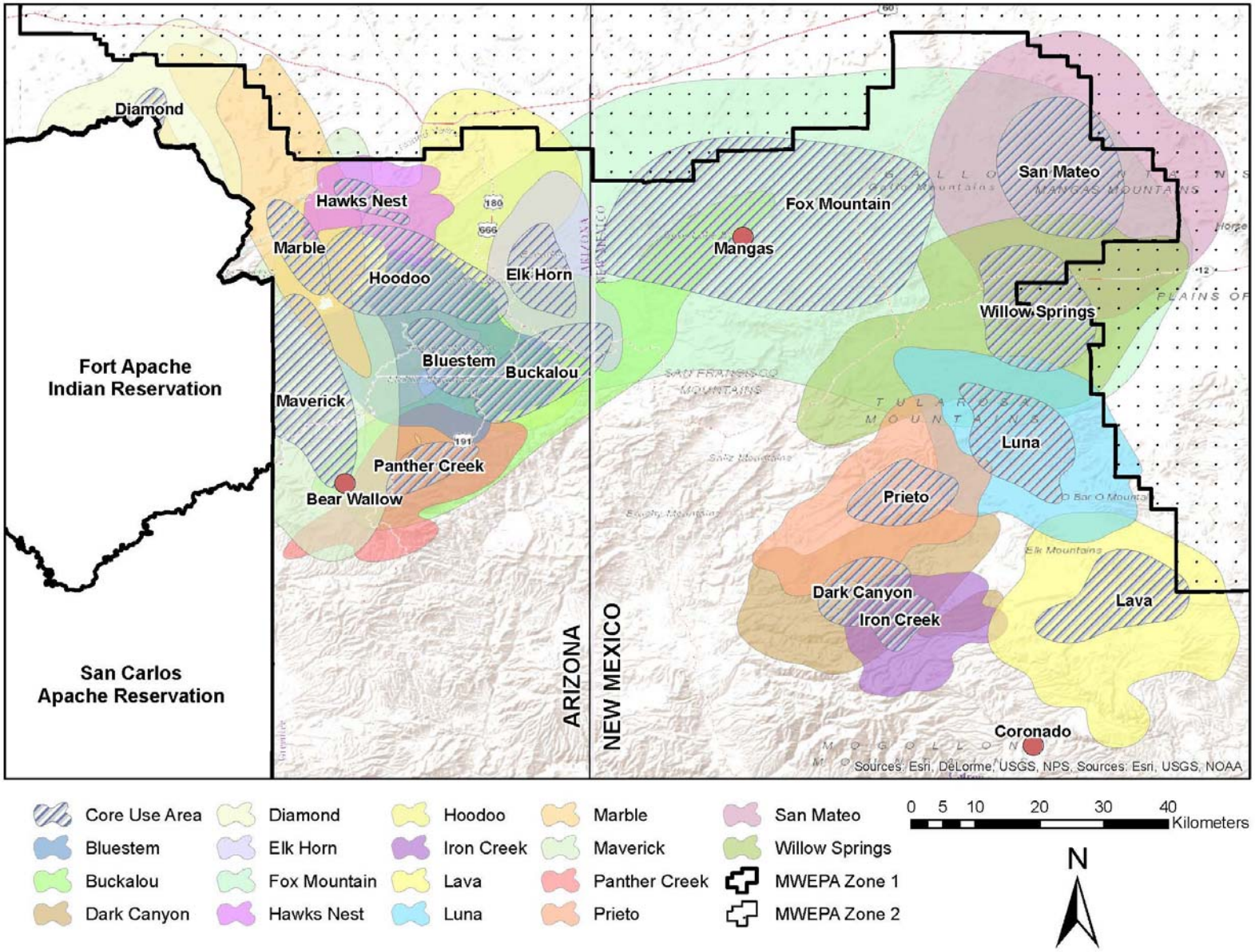

Figure 3. Mexican wolf home ranges for 2015 in Arizona and New Mexico within the Mexican Wolf Experimental Population Area (MWEPA). The shaded polygons on the map represent wolves having a minimum of 25 and a maximum of 366 independent radio locations and exhibiting movement characteristics consistent with a home range during 2015. The Bear Wallow, Coronado, and Mangas packs are represented with red dots because there were not enough locations in 2015 to calculate home ranges for these packs. See the following page for information regarding the wolf packs and home ranges.

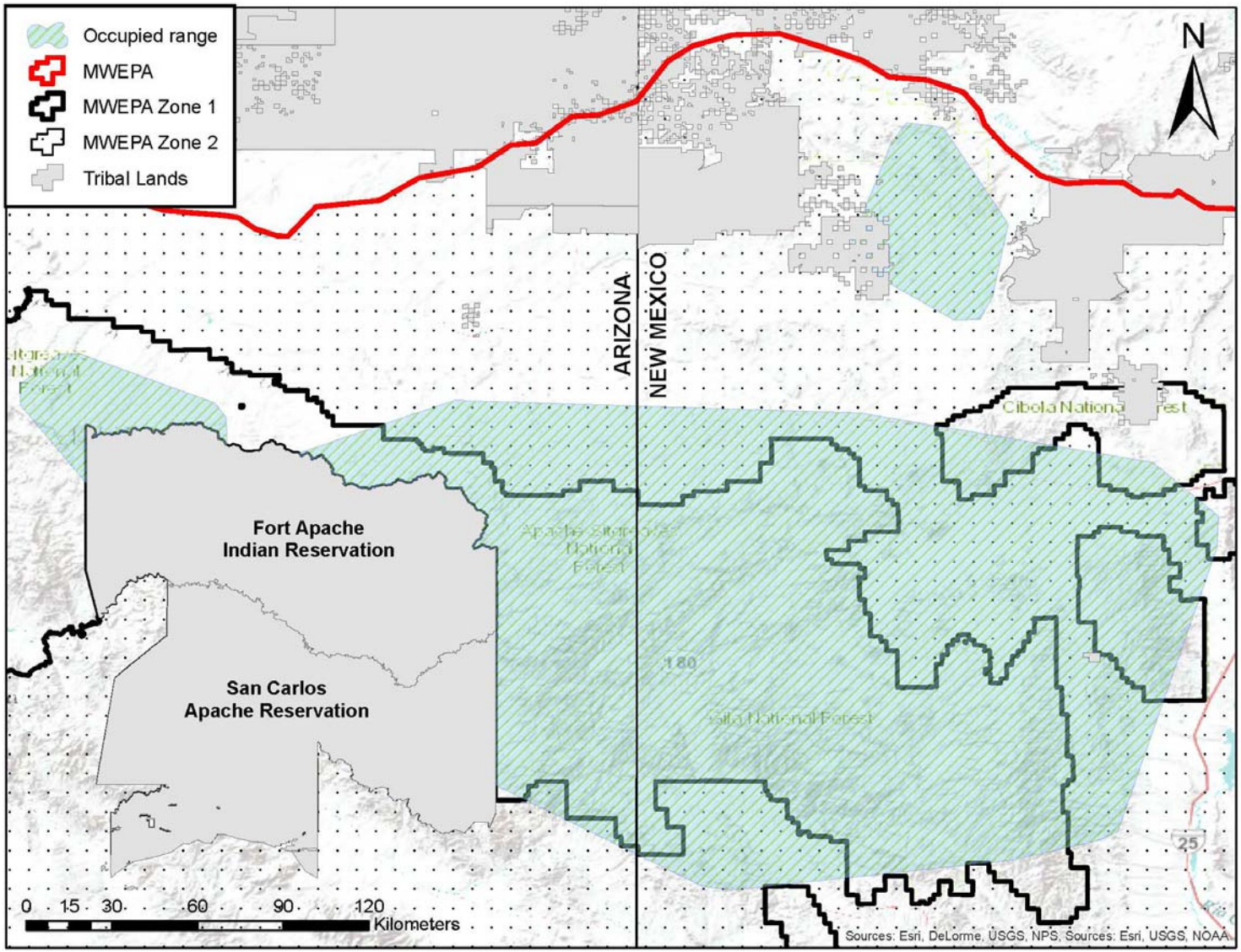

Figure 4. Mexican wolf occupied range in Arizona and New Mexico (2015) within the Mexican Wolf Experimental Population Area (MWEPA).

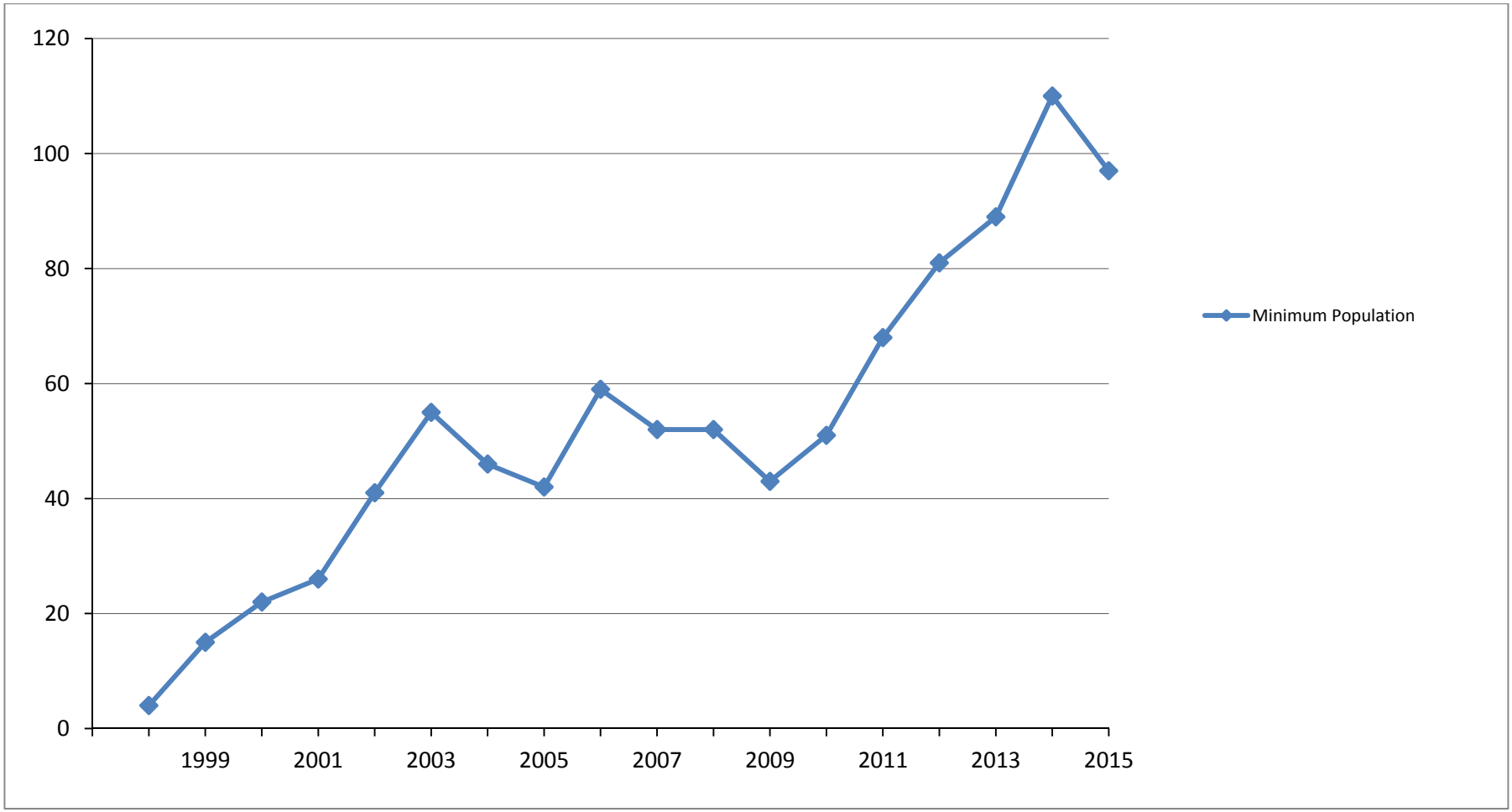

Figure 5. Mexican wolf minimum population estimates from 1998 through 2015 in Arizona and New Mexico.

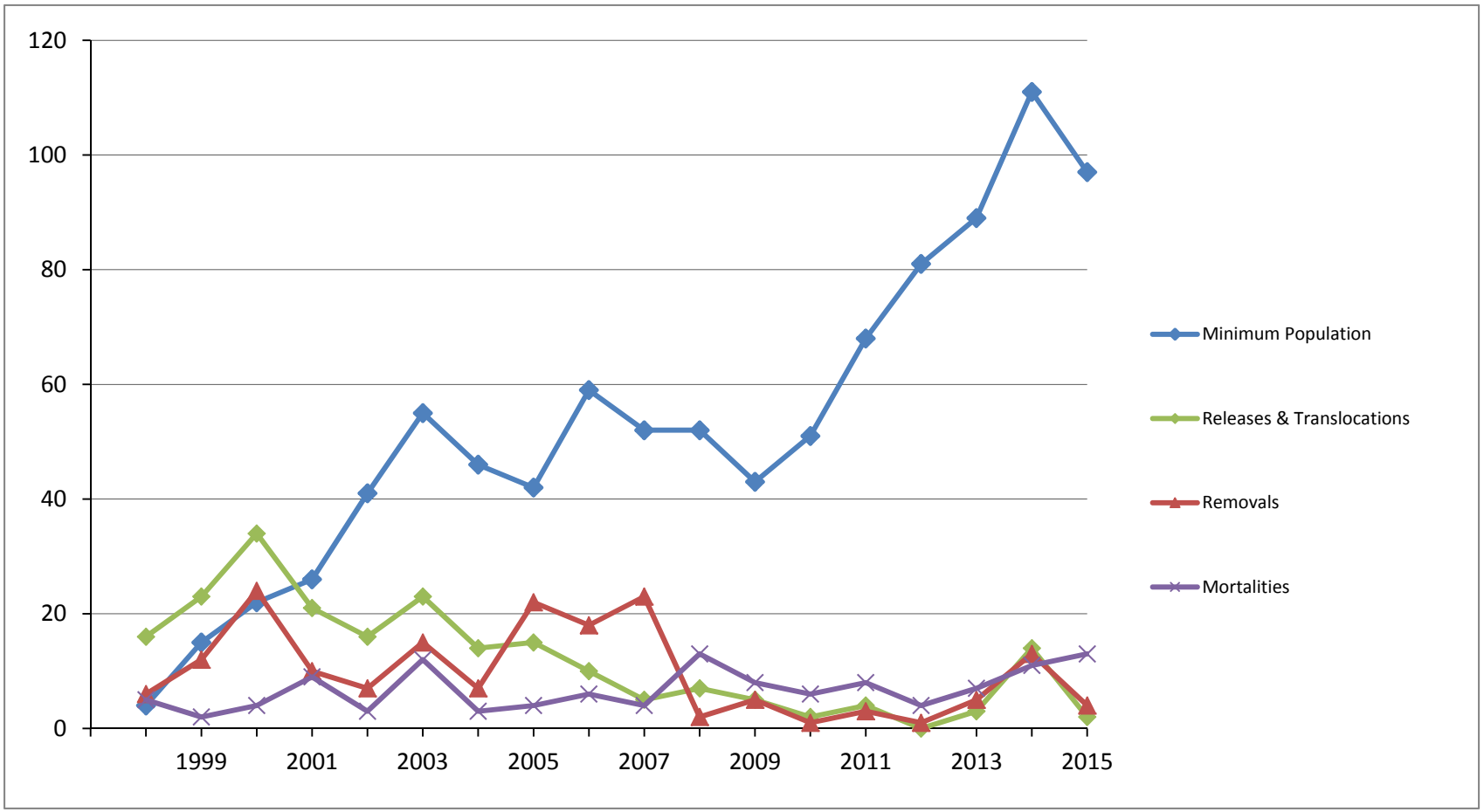

Figure 6. Mexican wolf minimum population estimates and associated population parameters (1998-2015). Releases and translocations included: initial releases (wolves released with no wild experience), translocations (wolves re-released from captivity back into the wild, and free-ranging wolves that were captured and re- released back into the wild for management purposes such as but not limited to boundary issues without having been placed temporarily into captivity). Removals included: wolves permanently removed from the wild (including wolves lethally controlled because they are associated with management actions), wolves temporarily removed from the wild and available for future translocation, and free-ranging wolves temporarily removed for management purposes such as boundary issues but without having been placed temporarily into captivity.

Appendix A. 2015 Pack and Single Wolf Summaries

7. Pack Summaries

Bluestem (AF1042, AM1341, f1333, m1382, m1404, and f1443)
In January, Bluestem consisted of eleven wolves (AF1042, AM1341, m1331, f1333, f1339, f1340 and five un-collared wolves). The Bluestem territory is in the central portion of the ASNF. Wolf m1382 and wolf AF1042 were captured and re-collared during the annual helicopter count in January. Wolf m1331 was also captured and temporarily removed from the wild for veterinarian care of an injury. He was released back into the Bluestem territory in February with a new radio collar. Wolf f1339 dispersed into the Panther Creek pack, and f1340 dispersed into the Marble pack. Wolf m1331 and f1405 dispersed and began traveling as single animals. Wolf m1404, wolf f1405, and f1443 were captured and collared on trap lines. AF1042 denned and produced a minimum of eight pups. Bluestem consisted of nine animals (AF1042, AM1341, f1333, m1382, m1404, f1443, and three pups) at the end of the year; however, f1333 began traveling with the Hoodoo pack at this time. Bluestem had 1 probable and 2 confirmed depredations, 6 captures, 0 mortalities, 0 fate unknowns, 0 removals, and 0 translocations. Bluestem is a breeding pair.

Bear Wallow (F1335 and M1338)
F1335 from the Maverick pack and m1338 from the Willow Springs pack paired in 2015 and established a territory in the central portion of the ASNF. Bear Wallow had no confirmed depredations, captures, mortalities, fate unknowns, removals, or translocations. The pair formed after the breeding season, and therefore did not reproduce, and is not a breeding pair

Buckalou (M1161 and F1405)
M1161 and F1332 were documented traveling together in the central portion of the ASNF in January. M1161 was captured during the annual population survey and re-collared. F1332 was found dead in February. M1161's collar malfunctioned and was not documented again until he was observed traveling with F1405 of the Bluestem pack. The pair maintained the same territory. Buckalou had 0 confirmed depredations, 1 capture, 1 mortality, 0 fate unknowns, 0 removals, and 0 translocations. Buckalou did not produce pups, and therefore is not a breeding pair.

Canyon Creek (AF1246, AM1252)
In January, Canyon Creek consisted of AF1246, AM1252. In late-March, AM1252 had not been located for three months and was classified fate unknown. In late-April, AF1246 had not been located for three months and was classified fate unknown. Canyon Creek had 0 confirmed depredations, 0 captures, 0 mortalities, 2 fate unknowns, 0 removals, and 0 translocations. Canyon Creek is no longer a pack.

Coronado (M1051)
In January, Coronado consisted of five animals: M1051, fp1348, mp1349, mp1350, and mp1351. Only M1051 and mp1350 were radio collared, and the remaining members were observed during the annual helicopter survey. Wolf mp1350 dispersed in February. M1051's radio collar failed in the fall but was detected on a remote camera at the end of the year. fp1348

and mp1349 could not be documented during the annual population count in January and are classified fate unknown. m1351 was found dead at the end of the year and the cause is under investigation. Coronado pack had 0 confirmed depredations, 0 captures, 1 mortality, 2 fate unknowns, 0 removals, and 0 translocations. Coronado is not a breeding pair.

Dark Canyon (AF923, AM992, M1293, m1354, m1347, and fp1444)

In January, Dark Canyon consisted of seven animals: AF923, AM992, M1293, m1354, m1347, and two uncollared pups. Wolf m1347 was captured and collared during the annual helicopter capture, and was confirmed to be one of two of the cross fostered pups from the summer of 2014. Dark Canyon used its traditional territory in the west-central portion of the Gila National Forest (GNF). Dark Canyon produced a minimum of 3 pups. A diversionary food cache was established in August as an attempt to discourage depredation behavior, and was removed in October when cattle presence declined. AF923 was captured and recollared, and fp1444 was collared in the fall. There were 7 animals in the pack at the end of the year: AM992, AF923, M1293, mp1354, m1347, fp1444, and an uncollared animal. Dark Canyon had 0 confirmed depredations, 3 captures, 0 mortalities, 0 fate unknowns, 0 removals, and 0 translocations. Dark Canyon is a breeding pair.

Elk Horn (AF1294, M1342)

In January, Elk Horn consisted of AF1294 and M1342. Although two uncollared Elk Horn pups were documented at the end of 2014, they were not documented during the 2015 annual helicopter operations. M1342 was captured and recollared during the annual helicopter survey, but that collar failed shortly after deployment. The pack's territory is in the northeastern portion of the ASNF in Arizona and the northwestern portion of the GNF in New Mexico. AF1294 was captured and re-collared in April. A blood sample confirmed AF1294 was pregnant. In late April, the pack apparently denned, but by the end of May, Elk Horn began traveling without pups. As of December 31, Elk Horn consisted of two animals: AF1294 and M1342. Elk Horn had 0 confirmed depredations, 2 captures, 0 mortalities, 0 fate unknowns, 0 removals, and 0 translocations. Elk Horn is not a breeding pair.

Fox Mountain (AM1158 and m1396)

In January, Fox Mountain consisted of AM1158, AF1212, mp1384, and two uncollared pups. Through the majority of the year, Fox Mountain was located within the northeastern portion of the ANF. AF1212 was found dead in January. Wolf mp1384 was captured and re-collared, and mp1396 was captured and collared; AM1158 was captured and re-collared. In early March, the USFWS issued a removal order for mp1384, mp1396 or an uncollared pup in response to several depredations (Table 7). Wolf mp1384 was captured and removed to captivity. No other wolves were captured and another depredation was assigned to uncollared wolves in the area. Two food caches were created to deter further depredations, and remote cameras were deployed to determine which uncollared wolf or wolves were responsible. In May and August, the IFT attempted to capture and recollar AM1158 but were not successful. In October, m1396 was located with f1397 from the Willow Springs pack. By November AM1158 was also traveling with m1396 and f1397. The IFT made an unsuccessful attempt to capture and recollar AM1158 in November. As of December 31, Fox Mountain consisted of two animals (AM1158and m1396). Fox Mountain had 6 confirmed depredations, 4 captures, 1 mortality, 0 fate unknowns, 1 removal, and 0 translocations. Two additional confirmed depredations occurred in or adjacent

to the Fox Mountain pack territory and were attributed to uncollared wolf/wolves. Fox Mountain is not a breeding pair.

Hawks Nest (AM1038, AF1280, m1383, fp1438, f1439)
In January, Hawks Nest consisted of AM1038, AF1280, and mp1383. Wolf AF1280 was captured and collared in January. The pack occupied their traditional territory in the ASNF. During March and April, Hawks Nest was used in the annual winter predation study period. In April, AF1280's radio collar failed, but she was documented throughout the year traveling with the pack. Wolf m1383 was captured and collared in May. Hawks Nest was used in the annual summer predation study period. Five pups were documented in the summer. Wolf fp1438 was captured and collared on August 21, and found dead on September 3. The cause of death is assumed capture related. Wolf f1439 was also captured and collared in August. In late October, f1439 dispersed to the western GNF, and by November was traveling with M1296 of the Mangas pack in New Mexico. As of December 31, the Hawks Nest pack consisted of AM1038, AF1280, m1383, f1439, and two uncollared pups. Hawks Nest had 0 confirmed depredations, 4 captures, 1 mortality, 0 fate unknowns, 0 removals, and 0 translocations. Hawks Nest is a breeding pair.

Hoodoo (AM1290, f1395, mp1441)
In January, Hoodoo consisted of M1290. On January 20, an uncollared wolf traveling with M1290 was captured, collared, and designated f1395 during annual helicopter operations. Wolf f1395's collar failed shortly after deployment. Hoodoo was documented throughout the year in the central portion of the ASNF in Arizona. A minimum of one pup was documented in the summer. Wolf mp1441 was captured and collared in September. Wolf f1395 was missing after November, and by the end of December AM1290 was traveling with F1333 of the Bluestem pack. As of December 31, Hoodoo consisted of AM1290 and mp1441. Hoodoo had 0 confirmed depredations, 1 capture, 0 mortalities, 1 fate unknown, 0 removals, and 0 translocations. Hoodoo is not a breeding pair.

Iron Creek (AF1278 and AM1240)
In January, Iron Creek consisted of three animals: F1278, M1240, and one un-collared pup. Throughout the year, Iron Creek was located in the north-central portion of the GNF. Five pups were documented in May. In mid-June, Wildlife Services investigated an injured dog near the Iron Creek den, the investigation was a confirmed wolf injury and assigned to AM1240. In September AF1278 and AM1240 were captured and re-collared. By the end of December, Iron Creek consisted of a minimum of five animals, including AF1278, AM1240, and 3 pups. Iron Creek pack had 1 injury on a domestic dog, 2 captures, 0 mortalities, 0 fate unknowns, 0 removals, and 0 translocations. Iron Creek is a breeding pair

Lava (AM1285, AF1295, and mp1446)
In January, Lava consisted of M1285 and F1295. Throughout the year, Lava used their territory in central portions of the GNF. M1285 was captured and recollared in February. In May a confirmed killed calf was assigned to AM1285. In response, the IFT established a diversionary food cache in an effort to reduce potential future depredations. In July, two confirmed killed calves were assigned to AM1285 and AF1295. It was discovered that a bear was excluding the pack from utilizing the food cache, and the IFT established a secondary diversionary food

cache. One pup was documented in the summer. Wolf mp1446 was captured and collared in October. As of December 31, Lava consisted of three animals (AM1285, AF1295, and mp1446). Lava had 2 confirmed depredations, 1 capture, 0 mortalities, 0 fate unknowns, 0 removals, and 0 translocations. Lava is a breeding pair

Luna (AF1115, AM1155 and m1398)

In January, Luna consisted of six animals: AF1115, AM1155, M1337, and three uncollared pups. AF1115 and mp1398 were captured and collared in February. The IFT investigated GPS clusters from mid-January through mid-February as part of the winter predation study period. Throughout the year, the IFT located Luna within its traditional territory in the north-central portion of the GNF. In March the IFT documented that AM1155 was missing two toes on a front foot and was not using the injured foot routinely. M1337 became fate unknown in March. AF1115 collar failed in March, but she was still documented with AM1155 throughout the rest of the year. In April, a dead cow was confirmed killed and assigned to 1-2 uncollared Luna juveniles. Although no denning behavior was determined, a possible set of pup tracks were observed; however, pups were never confirmed. In June, a cow was confirmed killed by wolves and assigned to an uncollared wolf potentially associated with Luna. In October, m1398 was captured and re-collared, and began dispersing in mid-December between east-central portion of the Apache-Sitgreaves National Forest and the north-central portion of the GNF. Luna consisted of three wolves by the middle of December which included AF1115, AM1155, and one un-collared sub-adult. Luna had 1-2 confirmed depredations, 3 captures, 0 mortalities, 0 fate unknowns, 0 removals, and 0 translocations. Luna is not a breeding pair.

Mangas (M1296)

In January, Mangas consisted of one animal (M1296). Throughout 2015, Mangas M1296 did not stay within its established territory around Mangas Mountain in the northeastern portion of the GNF. Instead, M1296 roamed widely throughout northern portions of the GNF and east to the San Mateo Mountains in NM. In November, Mangas M1296 was located with f1439 from the Hawks Nest pack, and remained together throughout the remainder of 2015 in northwest portions of the GNF. As of December 31, Mangas consisted of one animal (M1296), not clear if f1439 will remain. Mangas had no confirmed depredations, captures, mortalities, fate unknowns, no removals, or translocations. Mangas is not a breeding pair

Marble (AF1340, mp1440, fp1442)

In January, AF1340 was considered a member of the Bluestem pack in Arizona. Early in 2015, AF1340 began making dispersal movements and localized in the north-central portion of the ASNF in Arizona. In April AF1340 was traveling with AM1330. In June a cow was confirmed killed by the Marble pack. The IFT established a diversionary food cache to reduce potential for further depredations. Marble began utilizing the food cache shortly after and did not have further depredations. Five pups were documented in August. Wolf mp1440 and fp1442 were captured and collared August-September. As of December 31, Marble consisted of AF1340, AM1330, mp1440, fp1442, and one uncollared pup. Marble had 1 confirmed depredation, 2 captures, 0 mortalities, 0 fate unknowns, 0 removals, and 0 translocations. Marble is a breeding pair.

Maverick (AM1183, AF1291, and f1335)
In January, Maverick consisted of seven wolves (AM1183, AF1291, f1335, and four uncollared wolves). Throughout 2015, Maverick was located within their traditional territory on the FAIR as well as the central portion of the ASNF. As of December 31, the Maverick pack consisted of four wolves (AM1183, AF1291, and two uncollared wolves). Maverick had no confirmed depredations, captures, mortalities, fate unknowns, removals or translocations. Maverick did not reproduce and therefore is not a breeding pair.

Panther Creek (F1339 and M1394)
In January, M1394 was captured and collared. F1339 and M1394 paired and established a territory in central ASNF. A minimum of 1 pup was reproduced but could not be documented to have survived to the end of the year. In October AM1394 was captured and re-collared. As of December 31, Panther Creek consisted of two wolves (AM1394 and AF1339) Panther Creek had 0 confirmed depredations, 1 capture, 0 mortalities, 0 fate unknowns, 0 removals, and 0 translocations. Panther Creek is not a breeding pair.

Prieto (AF1251, AM1387, m1386, f1392)
In January, Prieto consisted of five animals: AF1251, AM1387, mp1386, fp1392, and one uncollared pup. Throughout the year, the Prieto pack was located in the north-central portion of the GNF. AF1251 was re-collared during the annual helicopter capture, but the new collar failed soon after. A minimum of six pups were documented in mid-May. A temporary food cache was maintained to reduce the potential for livestock depredations from June through October. Wolf f1392 was re-collared in October. AM1387's collar failed in November. Wolf f1392 was traveling with M1284 in the north-central portion of the GNF in December. By the end of the year, Prieto consisted of a minimum of nine animals which included: AF1251, AM1387, f1392, m1386, and 5 pups. Prieto had 1 confirmed and 1 probable depredation, 1 capture, 0 mortalities, 0 fate unknowns, 0 removals, and 0 translocations. Prieto is a breeding pair.

Rim (AF1305)
In January, Rim consisted of M1336 and AF1305. Rim occupied their traditional territory in the center of the ASNF. Both Rim animals were captured and removed from the wild to prevent the breeding of the siblings, and to instead pair them with unrelated wolves in captivity. Wolf AF1305 was paired with M1130 in captivity. The pair was released into the Rim territory after they were observed mating. However the pair did not stay together and a pregnancy test on AF1305 revealed it was not pregnant. M1130 was lethally removed due to habitual nuisance behavior (Table 9). AF1305 continued to travel alone throughout the center of the ASNF until she died in December. Rim had 0 confirmed depredations, 2 captures, 1 mortality, 0 fate unknowns, 1 removal, and 1 translocation. Rim is not a pack at the end of the year.

San Mateo (AF903 and M1345)
In January, San Mateo consisted of three animals (AF903, M1345, and one uncollared pup). San Mateo used their traditional territory in the northern portion of the Apache National Forest (ANF). Wolf fp1399 was captured and collared during the year-end helicopter count, but the collar failed soon after. A minimum of one pup was documented traveling with the pack. Wolf AF903 was killed by other wolves. As of December 31, the San Mateo pack consisted of three

animals (M1345, f1399 and one uncollared pup). San Mateo had 0 confirmed depredations, 1 capture, 1 mortality, 0 fate unknowns, 0 removals, and 0 translocations. San Mateo is not a breeding pair.

Tsay-O-Ah (F1283, M1343, fp1445)

Tsay-O-Ah occupied a territory located on the FAIR. In October, fp1445 was captured and collared. Tsay-O-ah had confirmed depredations, 1 capture, 0 mortalities, 0 fate unknowns, 0 removals, and 0 translocations. Tsay-O-Ah is a breeding pair.

Tse ighan lige (Diamond) (AM1249, f1388, fp1389, F1437, mp1447)

Diamond primarily occupied a territory on the FAIR. Wolves F1437 and mp1447 were captured and collared. Diamond had 0 confirmed depredations, 2 capture, mortalities, 0 removals, and 0 translocations. The Diamond pack is a breeding pair.

Willow Springs (f1397)

In January, Willow Springs consisted of nine AM1185, AF1279, m1338, mp1385, fp1390, m1391, and three uncollared pups. The pack held a territory in the north-central portion of the GNF. Wolf fp1397 was captured and collared during the annual helicopter count. Wolves AF1279 and mp1385 died in February. Wolf m1391 went missing in the early part of the year. Wolf m1338 began traveling with f1335 from the Maverick pack and became the Bear Wallow pack in Arizona. Reproduction was not documented. Wolf f1390 began dispersing in the fall. In November, f1397 traveling with AM1158 and m1396 of the Fox Mountain pack. AM1185 died in December. At the end of the year, Willow Springs consisted of f1397. Willow Springs had 0 confirmed depredations, 1 capture, 3 mortalities, 0 fate unknowns, 0 removals, and 0 translocations. Willow Springs is not a breeding pair.

8. Individual Wolf Summaries

M1282

Wolf M1282 was missing since the beginning of the year, but his collar was found at the end of the year. He is therefore documented as fate unknown.

M1284

In January, M1284 was traveling alone year throughout the GNF. At the end of the year M1284 was traveling with Prieto f1392 in the north-central portion of the GNF. He had no depredations.

m1331

Wolf m1331 was captured during helicopter annual survey and temporarily removed from the wild for veterinary attention, and released after a couple of weeks in his natal Bluestem territory. He later dispersed in May traveling between the ASNF and GNF throughout the rest of the year. He had no depredations.

M1350

By mid-February mp1350 had been separated from the Coronado pack and began traveling between the northern Gila Wilderness and the southern GNF. In April, mp1350 was involved in a nuisance incident near a residence in the southern GNF. The IFT successfully hazed him away.

However, he continued to return to the residence. Hazing efforts continued, and mp1350 again left the area. He returned in early May, and fladry was placed around the residence and the wolf was again hazed until he left the area permanently. He continued to travel in the southern GNF until mid-summer when he went fate unknown.

9. Personnel

Arizona Game and Fish Department
Jeff Dolphin, Field Team Leader
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Julia Smith, Wolf Biologist
Brent Wolf, Wolf Biologist
Mike Godwin, Wildlife Manager Supervisor
Joel Weiss, Wildlife Manager
Aaron Hartzell, Wildlife Manager
Chris Bagnoli, Regional Supervisor
Jason Capps, Wildlife Manager
Dave Cagle, Wildlife Program Manager
John Hervert, Wildlife Program Manager
Bill David, Chief Pilot
Pete Applegate, Pilot
Steve Sunde, Pilot
Steve Dubois, Pilot
Preston Hunts, Pilot

New Mexico Department of Game and Fish
Agency cooperation ceased July 1, 2011; however, District officers remain involved in law enforcement issues.

USDA-APHIS Wildlife Services
Sterling Simpson, Wolf Management Specialist
Matt Ellis, Wolf Management Specialist
Chris Carrillo, District Supervisor
Rudolph Fajardo, District Supervisor
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Phillip Hopper, Wildlife Biological Science Technician
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U.S. Forest Service
Vicente Ordonez – Forest Service Liaison to the Wolf Project

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Maggie Dwire, Assistant Mexican Wolf Recovery Coordinator
John Oakleaf, Senior Wolf Biologist/Interagency Field Projects Coordinator

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